CALIFORNIA
OIL WORLD
and Petroleum Industry

PUBLISHED TWICE A MONTH — ENGINEERING — TECHNOLOGY — LATEST NEWS

FIRST ISSUE
NOVEMBER 1941
VOL. 34 NO. 21
WHOLE NO. 1596

IN THIS ISSUE

IN
TWO PARTS
PART I

Pictures at the A.P.I. Convention 2

American Petroleum Institute Annual Meeting at San Francisco..... 3

A. I. M. E. Pictures 16

Los Angeles Annual Meeting of the American Institute of Mining and Metallurgical Engineers 17

Laugh This Off 20

Los Angeles Basin Development 22

San Joaquin Valley Development 26

Coastal District Development 28

Business Directory 32

PETROLEUM PUBLISHERS, INC. 939 SO. BROADWAY BLDG.
LOS ANGELES, CALIFORNIA-MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

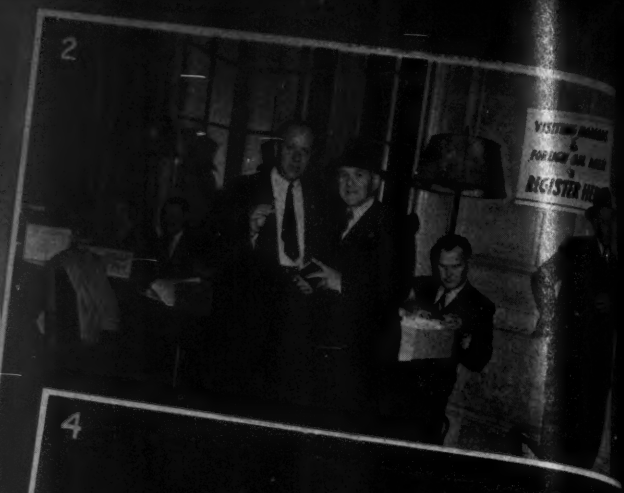
WALTER C. MONROE	President and Editor	VICTOR W. HEINZERLING	Assoc.-Editor
KINZIE MILLER	Vice President	DAVIS E. BROWNE	Secty.-Treas.
R. C. CONINE	Managing-Editor	L. O. MILLER	Advertising Manager

R. N. RICHEY, Manager California Oil World News Service and California Oil World Reference Edition

California Oil World and Petroleum Industry is published twice a month at 1009 in the 939 So. Broadway Bldg., Los Angeles, California. Entered as Second-class Matter January 1, 1937, at the post office at Los Angeles, California, under the Act of March 3, 1879. Subscription price $1 per year in U. S. and Possessions, $2 in foreign countries, including Canada. Member of the Audit Bureau of Circulations.

November 12, 1941

Telephone Number TUcker 2571


REGISTER HE

Annual A. P. I. Convention at San Francisco

Reveals Defense Position of Industry

Timeliness and practical value of the papers presented at the Twenty-second annual convention of the American Petroleum Institute in San Francisco during the first week of November, are clearly evident in the ensuing summaries of the presentations.

W. R. Boyd, Jr., president of the Institute, in his address, pointed out:

"1. That the American petroleum industry, in World War I, gave a most convincing demonstration of its ability to cooperate successfully and unreservedly with its government, which I submit as proof that it can and will do so in the existing emergency.

"2. That the American petroleum industry has the knowledge, the ingenuity, and the patriotic urge in the existing emergency, by working hand in hand with understanding and sympathetic government agencies, to meet every conceivable public and private need for petroleum products.

"3. That because there was such close, full, complete understanding and friendly cooperation with the governmental agencies, the job was so successfully done that the petroleum industry emerged from World War I in full possession of all its oil wells, all its plants, and all its facilities."

Mr. Boyd warned, however, that while:

"Autocracy is in arms, determined to impose its rule upon every people. We are committed to support those who are fighting it; and in that committment we shall not fail or falter, however much it means in hardships and sacrifices.

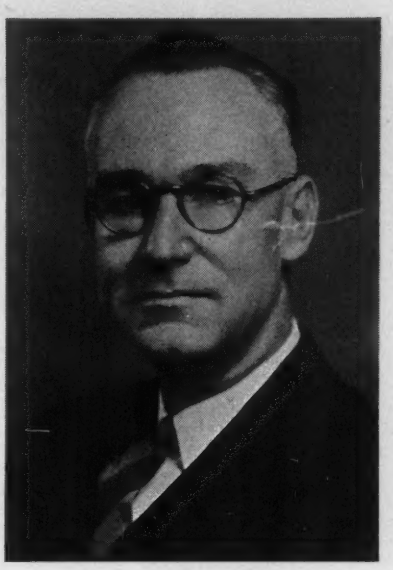
"We must not forget, when we submit to these hard disciplines, that the things we would preserve are themselves menaced by the very measures we must take to defend them. We shall be called upon to give up many of the satisfactions, to curtail many of the privileges, which have become part of our normal, democratic, American way of living. Business here in America during the war period will be done under restrictions and controls which in other circumstances would be intolerable. For defense purposes we shall be guided, directed, regulated. Influences will be at work over the world to turn our political and economic organization toward socialization, or totalitarianism, or whatever you choose to call it; hence, we owe it to ourselves and to our industry and to our nation constantly to be on our guard to insure that, in helping to win a military victory, we do not ourselves suffer a spiritual defeat. To crush the military forces of totalitarianism on the other side of the ocean, at the cost of entrenching its political and economic program here in America, would be a tragic end to a noble national effort."

Representative William C. Cole, Jr., in discussing the role of the legislative branch of the federal government in its relation to the petroleum industry, sounded a note of warning:

"Unanimity of purpose is the backbone of the national defense program and there must be no discord at this time. There must be a powerful unified movement of citizens, producers and state and federal officials in order to make conservation a part of the defense program. There must be uninterrupted flow of petroleum from producers to consumers, whether they be civilian or governmental. There should be no undue restrictions placed on the oil industry by state and federal authorities

←

1. James McPhee, Lane-Wells; Dave Anderson, Lane-Wells; Bill Eggleston, Union Oil; H. D. Aggers, Union Oil; S. H. Grinnell, Union Oil; J. McNeil, Union Oil; Bart Gillespie, H. & B. Sales, and Hi Cassidy, McCarty Co. 2. Bob Eiche, Robert Eiche Co.; H. Reinhold, Abegg & Reinhold, and Fred Ripley, Emsco. 3. Aub Jones, Gardner-Denver; Frank L. Brineger, Continental Supply; H. G. Meyers, Gardner-Denver; Charley Wagner, Wagner-Morehouse; Arch Campbell, Waukesha Motor Co., and Grant Swain, Waukesha Motor Co. 4. W. McGarry, Vapor Recovery Systems; Frank Holloway, Vapor Recovery; (Sam) C. Hamilton, Chicago Bridge; Frank V. Long, Vapor Recovery Systems, and Joe M. Greenlee, Vapor Recovery Systems. 5. Sam Gallay, World Petroleum; Si Fluor, Fluor Corporation; Fred Hudgens, Cooper-Bessmer, and Elmer Schmidt, Lone Star Gas. 6. H. M. Cosgrove, Tulsa Purchasing Agents Assn.; Milton Lewis, Fluor Corp.; Bob Nagel, U. O. P., and Elmer Decker, Martin-Decker. 7. Morton Higgs, Lane-Wells Co.; Burt Gibbons, Union Oil Co.; Charles Toll, Western Pipe & Steel; Dave Day, Richfield Oil, and Pete Maxfield, Merco Nordstrom. 8. John Bolenger, General Pet.; H. S. Donovan, General Pet., and H. Boezinger, Merco Nordstrom. 9. Col. Rockwell. Pittsburgh Equitable Meter: H. H. Kelley, P. A. Richfield and Capt. Higgins, Pittsburgh Equitable Meter.

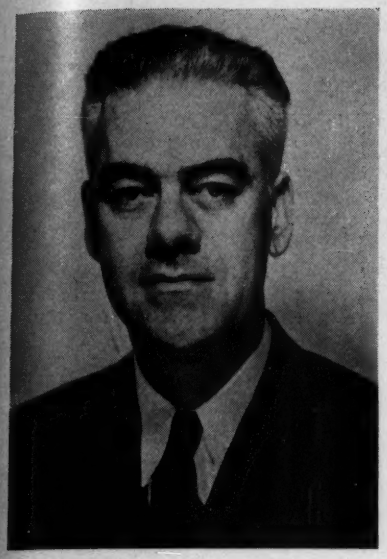


Basil Hopper

F. S. Bryant

Harold L. Ickes

ENTERTAINMENT INFORMATION



Harvey T. Kennedy

if our gigantic task is to be accomplished and the American way of life to be continued at all times.

"You who believe in free enterprise regulated in the public interest or in what may be called 'humanized business' have to meet a challenge of making that system constantly even better for the common weal. Any failure to meet the peak loads of these crowded days will be seized upon by the enemies of free enterprise as an excuse for the taking over and nationalizing of industry. The excuse may not be valid but the loads imposed on industry by government may be arbitrary and unpredictable."

Petroleum Coordinator Harold L. Ickes, in concluding his talk to the Institute members, said:

"What I am leading up to is that if the federal government ever imposes any measure of control over the oil industry, it will be in the interest of conservation. Wasteful practices, sooner or later, bring some type of federal control. And wasteful practices in the oil industry will also bring some measure of control, probably not during my tenure of public office, but yet surely and inevitably. The way, and the only way, in which to make unnecessary such control as will prevent waste and intemperate exploitation will be for you to exercise that measure of self control which will persuade the government that you are managing your own affairs so competently, so wisely and so patriotically as to make unnecessary any interference by the people.

"May I say, out of my friendly interest in the oil industry, and as a man who has come to know you and to appreciate you, better than I once did, that such practices as obtain in my own state of Illinois and in this state of California, are better calculated to bring about at least some measure of federal control of the oil business than a thousand 'would-be czars.' You have had the power to stop those practices; you have such power today. But you have not exercised it.."

Robert F. Cory

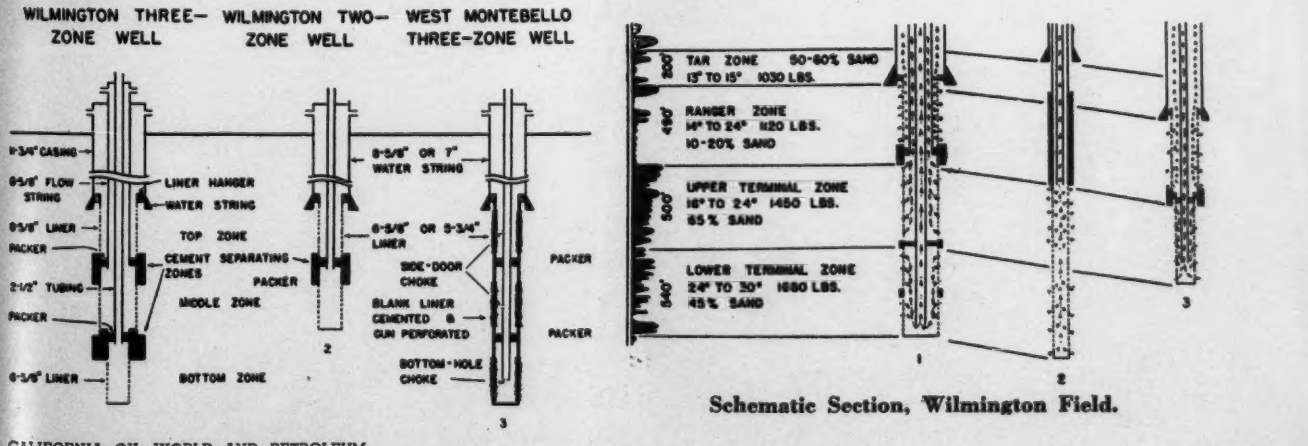
D. R. Knowlton, of Phillips Petroleum Co., abstracts his paper, "Closer Association Between the Production Engineer and His Operating Co-worker," as follows:

"The development of petroleum engineering as a distinct and independent profession is discussed. The principal types of administrative organization in general use by oil companies are explained briefly. It is stated that the effectiveness of the association between a production engineer and any operating coworker is in some degree directly proportional to the mutual respect and confidence which exist between them. By the selection and proper development of capable men for the jobs, by definitely instructing them as to their responsibility and authority, and by requiring joint and concerted action by them, the association of the production engineer and his op-

California Oil World is indebted to The McCarty Co., advertising agency of Los Angeles and San Francisco, for the four full pages of A.P.I. pictures presented here.

←

10. Captain Higgins; Colonel Rockwell; C. A. Dunlap, Humble Oil, and C. K. Madison, Merco Nordstrom. 11. William De Ridder, and Colonel Rockwell. 12. A. G. Fisk, Honolulu Oil Co.; H. M. Van Clief, Honolulu Oil Co.; E. W. Forrow, Security Engineering, Houston, and Pete Maxfield, Merco Nordstrom. 13. Rodney S. Durkee, president of Lane-Wells. 14. Hi Cassidy, McCarty Co.; L. P. St. Clair, Union Oil Co., and Rodney Durkee, Lane-Wells Co. 15. N. W. Wickersham, Int. Cementers; R. J. Ritner, Int. Cementers; J. C. Axelson, Axelson Manufacturing Co., and A. Zwerneman, Axelson Manufacturing Co. 16. R. J. Ritner, Int. Cementers; J. C. Axelson, president of Axelson Mfg. Co.; N. W. Wickersham, Int. Cementers, and Alvin Zwerneman, Axelson Manufacturing Co. 17. J. C. Axelson, Axelson Manufacturing Co.; Alvin Zwerneman, Axelson Manufacturing Co.

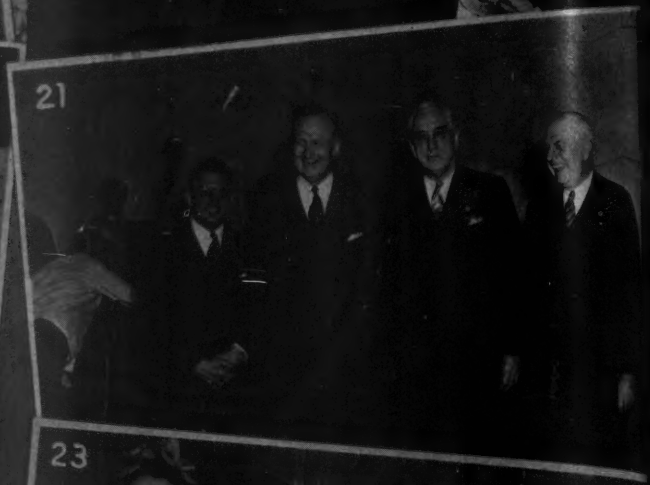


Schematic Section, Wilmington Field.

18

19

20


21

22

23

24

25

erating co-worker will be more harmonious, more efficient, and more profitable."

Robert F. Cory, of The Texas Co., presented "A Review of Multiple-Zone Production in California." He epitomizes thus: "A multiple-zone well is one which does the work of two or more single-zone wells, keeping the production from each zone under separate control. The zones should be kept separate because of varying conditions between them. Multiple-zone wells are used when space is limited, when high potentials per well are important, when most of the recovery will be by natural flow, or when one zone can be used to gas-lift oil from another zone. A two-zone well is to be preferred to a three-zone well as the two-zone well is less complex, and hence offers less possibility for trouble.

E. M. Fitz

←

18. J. C. Axelson, Axelson Manufacturing Co., and Alvin Zwerneman, Axelson Manufacturing Co. 19. John Peat, Rodney Durkee, George Radcliffe, M. L. Dorn, Mrs. M. L. Dorn, and Mrs. Rodney Durkee. 20. Back Row: Wallace Sawdon, Bill Love, George Eickler, Jay Curts and Ken Sclater; Third Row: Kinzie Miller, Tom Nelson, and Larry Miller; Second Row: Sam Gallay and R. Wipperman. Front Row: Bill Wilde, John Eastman, and Hi Cassidy. 21. E. W. Forrow, Rex Hamaker, W. L. Childs, and N. R. Crawford. 22. D. A. Sikes, Miss Ann Godwin, Miss Teresa Boruk, Amos Roberts, Mrs. M. Renfro, Hugh Harris, and Mrs. Robert A. Hill. 23. Mrs. Elmer Decker, Mrs. M. E. Montrose, Mrs. James McPhee, Mrs. W. S. Bettis, Mrs. M. Renfro, and Mrs. R. B. McCullar. 24. N. T. Works, J. M. O'Melveny, E. W. Forrow, Kenneth Craver, G. Egloff, A. Levy, E. G. Leonardon, Rogert Henquet, and Ray Dudley. 25. A. V. Simonson, Mrs. A. V. Simonson, J. Zunino, Sam Gallay, Rex Hamaker, and George Wood.

"The chief problem in drilling and completing a multiple-zone well is cementing the pipe between zones. The production problems are more serious. Packers are likely to give trouble. Sand production can cause serious trouble. Repairs are generally difficult and expensive.

"The principal use of multiple-zone wells in California has been in the Wilmington and West Montebello fields. The results have been satisfactory, but California practice indicates that, in general, single-zone wells are to be preferred to multiple-zone wells."

Discussing the advantages of separating zones, the author says:

"Separation of several zones should be maintained either by separate wells to each zone or by multiple-zone wells. If several zones are open in one well without separation, the pressure differences between several zones may result in forcing oil from the high-pressure zone into the low-pressure zones. This may mean either rendering large volumes of oil and gas unrecoverable, or in many cases it is a direct gift to competitors. Fig. 2. showing conditions in the Wilmington Field, illustrates this possibility.

"Under curtailment, when a well produces several zones separately, all zones may be used to establish the potential; and then the allotment can be produced from the zones yielding the most valuable oil. Or, if the volume of gas produced is the basis for curtailment, as is the case in the West Montebello Field, the zone with the lowest gas-oil ratio may be produced alone after the potential has been established. If the various zones on a lease are produced by separate wells, when conditions permit, for economic or mechanical reasons, a few wells may produce the allowable for the lease.

"By isolating the various zones the advance of edge water can be controlled, and the flooding of a lower zone can be avoided when an upper zone goes wet. Separating wet zones from zones producing clean oil also reduces the cost of dehydrating the oil, because a smaller volume of fluid has to be treated.

"When production of sand is a problem, isolating the various zones allows accurate control of the production rate from each zone, a condition not possible when several zones are open together. In many cases the production of sand can be prevented, if the troublesome zone is produced in the proper manner and at the proper rate. . . .

"Under competitive conditions, the recovery to be expected from a multiple-zone well will be greater than from a single-zone well, but will be less per zone. The relative values of the differences in production, compared with the costs of obtaining the production differences, usually should be the determining factor. In the Wilmington Field the cost of a two-zone well is approximately 10 per cent more than of a single-zone well. The 3-zone wells cost 30 to 50 per cent more than a single-zone well. . . .

"A summary of the installation difficulties and repairs required by the multiple-zone wells, without regard to field, and including only wells which do not mix the production by using side-door chokes or similar methods, is as follows:

	Description	Number of Wells	Percentage of Total Wells
1.	Wells on continuous production	192	88.5
2.	Circulation cut tubing.	5	2.3
3.	Packers leaking (repaired and rerun)	6	2.8
4.	Cement plugs leaking (recemented)	2	0.6 of cement-plug points
5.	Casing collapse above packers	1	0.5
6.	Bottom-hole water	6	2.8
7.	Hole deepened	2	0.9
8.	Change from 3 to 2 zone	4	1.8
9.	Change from 2 to 1 zone	6	2.8
10.	Change gas-oil ratios	2	0.9
11.	Miscellaneous	6	2.8

12. Twenty-nine of the wells which have been on continuous production since their installation date show an approach toward gravity equalization for the oil obtained from the respective zones. This can be caused by any of the following:
    a. Fluid-cut holes in flow string above packer.
    b. Natural change in gravity due to production withdrawal from sands.
    c. Packers developing leaks.
    d. Cement plugs developing leaks.

    None of these wells has been pulled for repair; therefore, the nature of cause cannot be determined to date.

"In spite of the foregoing statistics, the present trend is away from the multiple-zone wells. This is due partly to the approach of the end of the flowing life."

R. S. Grant, of Hughes Tool Co., and H. G. Texter, of Spang Chalfant, Inc., in their paper discuss, "Causes and Prevention of Drill-Pipe and Tool-Joint Troubles." The authors describe drill-pipe and tool-joint troubles and means of preventing them. It is stated that true twistoffs, spiral tears, and tension failures have been practically eliminated by improved pipe manufacturing and drilling practices. Failures at the last-engaged thread and leakage through threads also

26

27

28

29

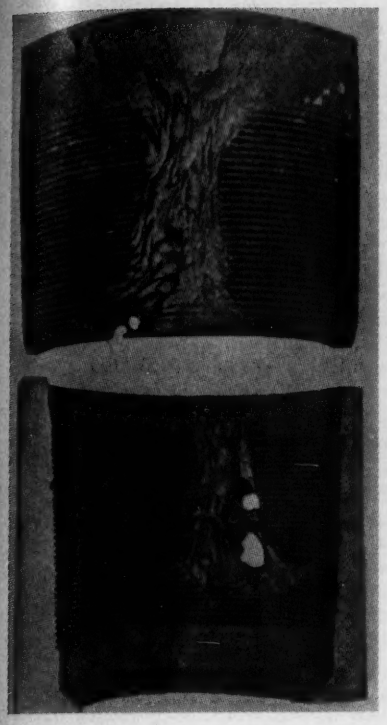
30

31

32

33

34

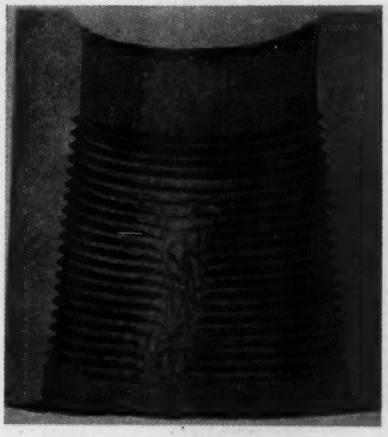


Effect of Leakage Through Threads Due to Tool-Joint Threads being Mismated with Pipe Threads.

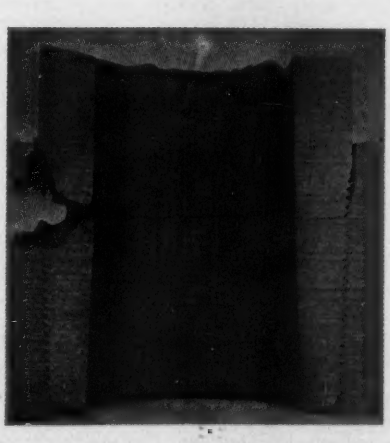
have been practically eliminated through improvements in design and in installation methods.

Fatigue breaks are the most common type of drilling-pipe trouble today. They may be pure fatigue failures, but much more often are accelerated by notches or scars and by corrosion. Fatigue breaks may be reduced greatly by the use of adequate drill-collar weight, and this is

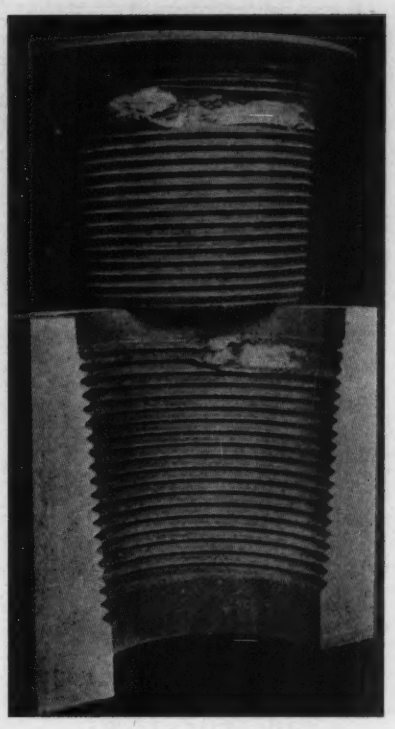
Wabble Failure in Tool-Joint Pin Resulting in a "Washout."



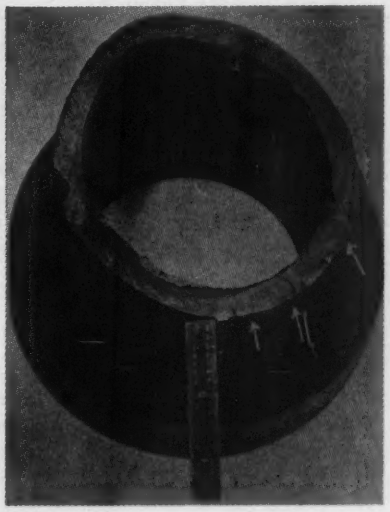
Wabble Failure in Tool-Joint Box Resulting in a "Washout." Note: This Box is Companion to Pin Shown in figure above.



Incomplete Failure in Last-engaged Thread, Showing Effect of Mud Cutting.



Example of Galled Tool-Joint Pin and Box Threads which may Occur when Proper Care and Attention are not Exercised in Handling the Joints.



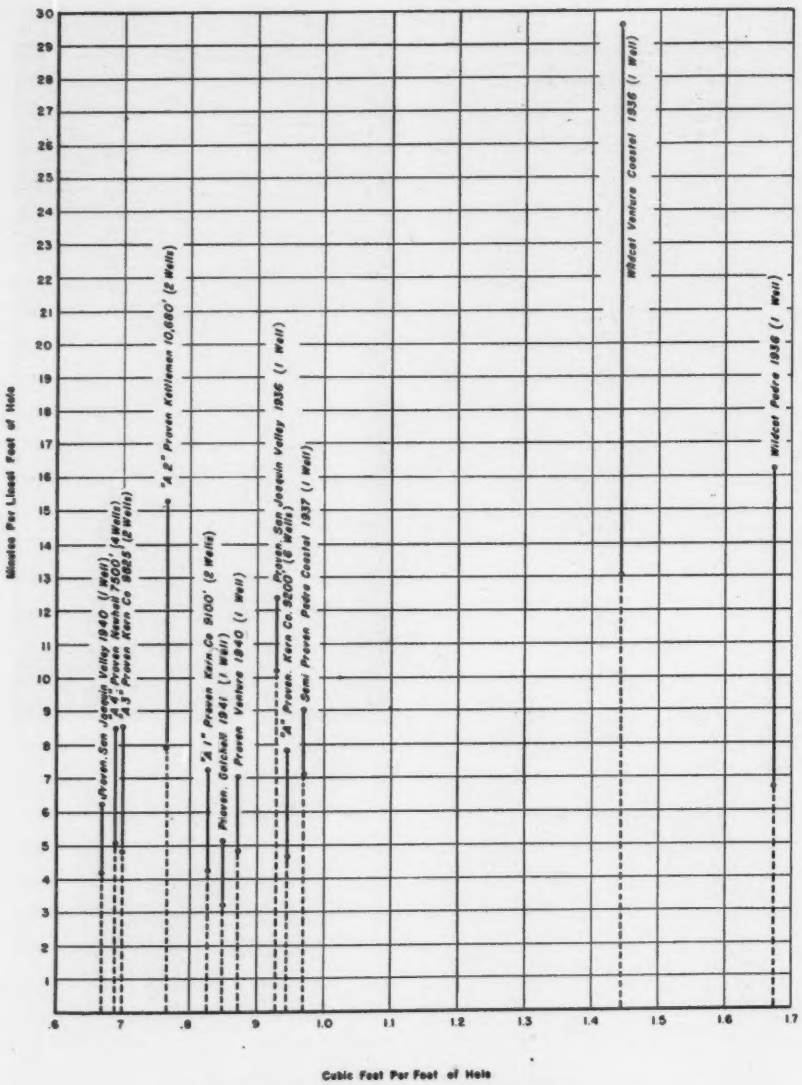
Fatigue Failure from Too Sharp Radius in Upset Runout.

probably the most important recommendation that can be made to increase the life of drill-pipe. Troubles arising from worn pipe best can be prevented by keeping the pipe straight. Pipe usually is made crooked by running the string in compression. Collapsed pipe, although rare, usually occurs while making drill-stem tests.

Wall eccentricity, internal erosion, and

←

26. Larry Miller, Ernie Fowks, and Kinzie Miller. 27. H. M. Cosgrove, N. R. Crawford, T. C. Siegle, F. E. Cooper, and W. B. Way. 28. Back Row: Mrs. Dale Nix, Mrs. W. N. Forker, James Robinson, Mrs. I. F. Brown, Mrs. J. V. Robinson, Mrs. Tom Murphy. 2nd Row Standing: Mrs. Morton Higgs, Mrs. W. S. Bettis, Mrs. William Paraga, Mrs. W. S. Evans. Front Row: Mrs. I. B. Wood, Mrs. G. L. Kothny, Mrs. J. E. Richards, Mrs. Ray Dudley, and G. L. Kothny. 29. Ernie Fowks, Lou Bronzan, and Jack Walton. 30. Back Row: T. Campbell, J. W. Walton, J. N. MacDonald; Front Row: L. R. Smith, Brenton Welser, Ernie Fowks, and Lou Bronzan. 31. Mrs. Elmer Decker, Mrs. M. E. Montrose, Mrs. James McPhee, Mrs. W. S. Bettis, Mrs. M. Renfro, and Mrs. R. B. McCullar. 32. Wallace Davis, G. E. Whitney, Baker Oil Tool, and Ted Sutter, Baker Oil Tool. 33. M. E. Montrose, Lane-Wells; E. A. Eddleman, Ideco Derrick; Morton Higgs, Lane-Wells; Sam H. Witheston; L. L. Rector, Rector-Wall Equipment, and Ted Sutter, Baker Oil Tool. 34. Jack Ballagh, Patterson-Ballagh; Hal Marsh, Gen. Petroleum; Paul Jones, Westinghouse Mfg. Co., and M. L. Dorn, Lane-Wells Co.


Minutes Per Linear Foot of Hole
Cubic Feet Per Foot of Hole
Proven, San Joaquin Valley 1940 (1 Well)
"A" Proven Kern Co 7900' (4 Wells)
"A" Proven Kern Co 9025' (2 Wells)
"A" 2" Proven Kettleman 10,680' (2 Wells)
"A" 1" Proven Kern Co 9100' (2 Wells)
Proven, Gaichell 1941 (1 Well)
Proven Ventura 1940 (1 Well)
"A" Proven, San Joaquin Valley 1936 (1 Well)
"A" Proven Kern Co. 9200' (6 Wells)
Semi Proven Pedro Coastal 1937 (1 Well)
Wildcat Ventura Coastal 1936 (1 Well)
Wildcat Pedro 1936 (1 Well)

Graphic Analysis of Drilling Speed—California.

From "Reduction of Hole Size in Drilling".

magnetism, although often discussed, have never been proved to be causes of drill-pipe failures. Longitudinal splitting of the pipe ends of tool joints has been practically eliminated by the use of upset forgings. Splitting or swelling of the pin and box ends can be prevented by the use of special lubricants.

Galling and wabble failures are the two most common tool-joint troubles today. The former best can be prevented by careful breaking in and adequate lubrication. Wabble failures result from operation of the joint while loose, and are aggravated by the modern practice of running drill strings in tension. They best can be prevented by adequate tonging and by care in handling to prevent damage to shoulders.

Tool-joint wear cannot be prevented, but the effects and costs entailed can be minimized by the use of easily replaceable tool joints, oversize tool joints or wear subs, and by sleeving or hard-surfacing of either the tool joints or subs.

I. W. Alcorn, of Pure Oil Co., and J. U. Teague, of Hogg Oil Co., abstract their paper, "Reduction of Hole Size in Drilling as Affecting Costs, Completion, and Production Practice," as follows:

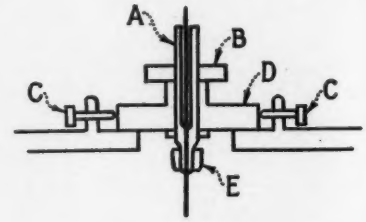
An attempt to analyze a problem such as indicated by the title of this paper is a very ambitious venture, and the final solution is not to be found in this paper. Rather, it is an approach to the solution, which it is hoped will stimulate additional work on this important subject. This paper represents a joint effort of the Southwestern District Topical Committees on Drilling and Production Practice.

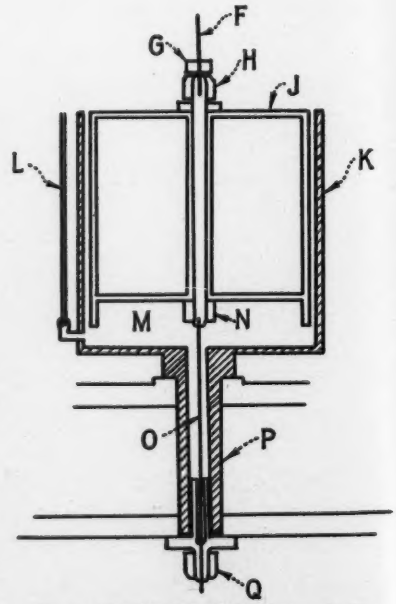
The data submitted on some 2300 wells from all sections of the country indicate a trend toward the drilling of smaller-diameter holes, both exploratory and proven, and completing wells with smaller casing. Substantial savings are being realized in initial well costs by this practice.

No particular difficulty has been reported in drilling, completing, or producing the small-diameter wells. Nearly all the fields on which data were obtained are in the flowing stage; therefore, little information is available on artificial-lift installation in the small-diameter wells. But the predictions are that no trouble will be experienced with artificial-lift equipment in the small-diameter wells, except when a large volume of fluid will have to be produced with rod pumps.

Small-diameter wells can be repaired by all commonly used methods as easily and cheaply as large-diameter wells, except when the well is to be deepened or sidetracked. Then the small-diameter well is at a disadvantage.

The great majority of the small-diameter wells were completed with 5½-in. O.D. casing, which is considered by the majority of those who submitted data to be the smallest practical casing size to





From "Drilling-Fluid Viscosimetry".

use. The popular size hole to drill for setting 5½-in. O.D. casing seems to be 8¾-in. A 9⅞-in hole was drilled for the majority of the large-diameter wells reported, and 7-in. O.D. casing was set as the final casing string.

The trend toward the drilling of smaller holes and setting smaller casing probably will continue because of the lower initial well cost, long expected flowing life of most fields, and the low rates of production on individual wells under enforced curtailment of production.

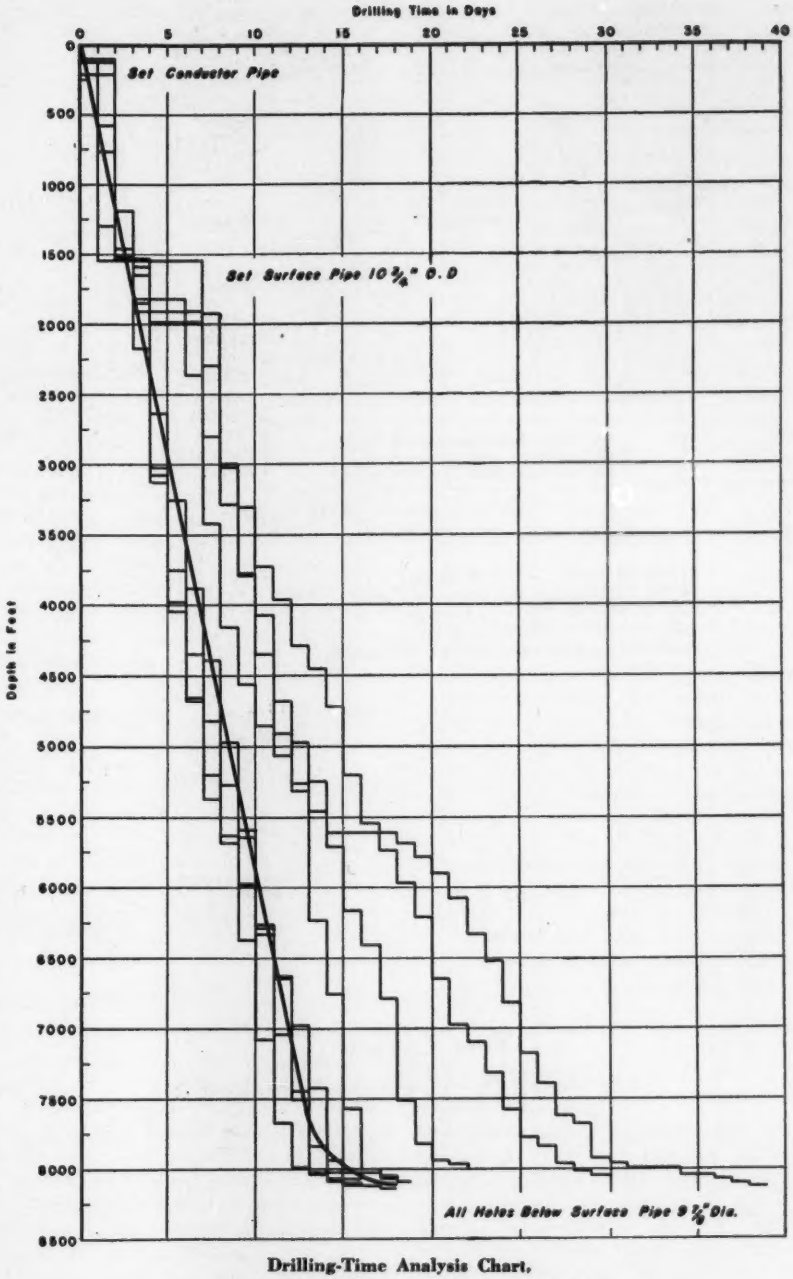
R. Floyd Farris, of Stanolind Oil & Gas Co., in his paper, "A Practical Evaluation of Cements for Oil Wells," describes "a special test procedure for evaluating cement slurries at temperature and pressure conditions which are reasonably close to those actually prevailing in the slurry during a cement job. Actual cementing conditions, as determined by extensive testing during cementing operations in various fields, are simulated in the pressure-type consistometer in a manner which relates stirring time as a function of well depth.

"The results are made directly applicable to field problems by representing cement performance at various hypothetical well depths on a depth-vs.-total-cementing-time chart which the field engineer may use as a guide in the selection and use of cements for any depth."

Conclusions drawn are: 1. That high bottom-hole temperatures do not exist during normal cementing operations; 2, that the effect of pressure on cement is considerable and actually overshadows the temperature effect; 3, that it is possible to approximately duplicate actual cementing temperatures and pressures in the laboratory and obtain results which have a close relation to cement pumpability; and, 4, that the results may be expressed in a form readily applicable to the problems of the field engineer.

W. T. Cardwell, Jr., of Standard Oil Co. of California, abstracts his paper, "Drilling-Fluid Viscosimetry," thus: "This paper discusses the shearing-rate-shearing-stress-time relationships of drilling fluids. Because of the complexities of these relationships, special precautions must be taken in the design of drilling-fluid viscosimeters if the measurements are to be of definite, quantitative significance.

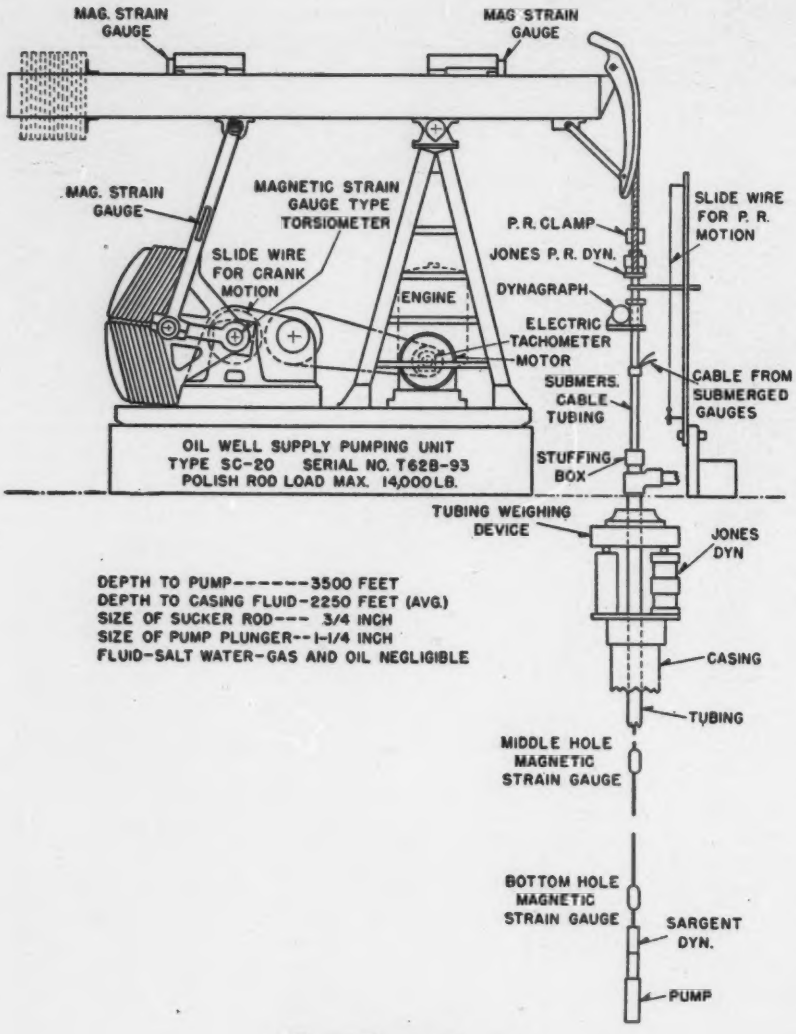
"A method is presented by which data obtained with a suitably designed instrument can be converted into absolute shearing-rate-shearing-stress curves. The procurement of rigorous viscosimetric data is suggested as the best means toward the practical solutions of field drilling-fluid-viscosity problems. In particular, it is indicated how the 'shear strength,' if suitably determined, may be used to predict the size of the suspendable particles in a quiescent drilling fluid."



Drilling-Time Analysis Chart,
From "Reduction of Hole Size in Drilling".

The author summarizes: "1. The viscous behavior of drilling fluids in the low shearing-rate region is considered in suggesting a definition of 'shear strength.' 2. The application of the concept of 'shear strength' to the problem of particle suspension is considered. 3. The limitations of instruments currently used for drilling-fluid viscosimetry are discussed. 4. An improved coaxial cylinder type of viscosimeter is described, which is capable of yielding rigorous measurements of the viscous behavior of drilling fluids. 5. A method is indicated by which drilling-fluid viscosimetric data may be reduced to absolute shearing-rate-shearing-stress data. 6. Examples are presented of drilling-fluid viscosimetric data in absolute units."

H. E. Dralle and E. H. Lamberger, of Westinghouse Electric & Manufacturing Co., brief their paper, "Oil-Well Tests Suggest New Rating Standards," thus: "In oil-well pumping there are many known variables which directly affect the design and application of equipment used in the economical production of oil. To ascertain the individual effects of these variables on the perform-



Test Layout.

From "Oil-Well Tests Suggest New Rating Standards".

ance and ratings of oil-well equipment and to augment the many theoretical considerations already given to them, Phillips Petroleum Co., Sargent Engineering Co., and Westinghouse Electric & Manufacturing Co. jointly made a series of more than 200 tests, extending over a continuous period of 6 months.

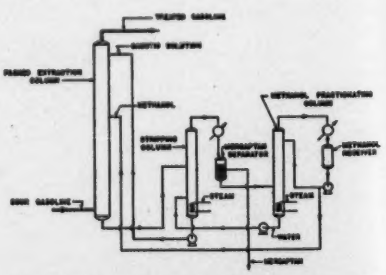
"The actual tests included independent variation of the speed, stroke length, counterweight, working barrel size, tubing diameter, and type of prime mover. Under these varying conditions, oscillographic film was used to show 14 simultaneous records of instantaneous loads and displacements occurring during a pumping cycle. Instruments were placed in the incoming power line, in the low-speed gear shaft, on the pitman, at two different points on the walking beam, on the polished rod, and at two different points in the sucker-rod string. Correlated with these were polished-rod dynagraph charts and bottom-hole dynamometer records.

"The paper covers that part of these tests which suggests the development of new formulas for predetermining, from a known set of well conditions: 1. Peak polished-rod load. 2. Pump plunger stroke. 3. Peak crankshaft torque. These new formulas, with supporting data, are given, and results from their use compared with those obtained from existing formulas and with actual test results. Suggestions also are made that other perplexing problems incident to oil-well pumping may be solved conveniently with these same basic and fundamental test data."

B. H. Sage and W. N. Lacey, of California Institute of Technology, abstract their paper, "The Prediction of the Properties of Hydrocarbons at Elevated Pressures," as follows: "A discussion of some of the methods currently available for the prediction of the thermodynamic and phase behavior of naturally occurring hydrocarbon mixtures is presented. The concept of equilibrium in both homogeneous and heterogeneous systems is discussed, and the utility of the fugacity as an index of the equilibrium in heterogeneous systems is described. The available background of experimental information pertaining to this problem is indicated, and the fields in which additional experimental work is necessary are pointed out. The objective of this discussion primarily is to indicate the status of such methods of prediction and the possibilities of improving their accuracy as additional information accumulates."

In "Prediction of Volumetric and Phase Behavior of Naturally Occurring Hydocarbon Systems," C. R. Dodson and M. B. Standing, of Standard Oil Co., of California, discuss procedures and factors which affect the prediction of phase and volumetric relations in mixtures of natural hydrocarbons. Comparisons of the calculated and experimental results are given for 3 systems yielding crude oil varying in gravity from 27 to 55 deg. API at 60/60 deg. F., and gas-oil ratios from 525 to 10,200 cu. ft. per barrel, respectively. The volume calculations, the authors say, are based upon the method of partial volumes as proposed by W. N. Lacey and B. H. Sage. The influence of items, such as the viscosity-gravity-factor correction on the methane equilibrium constants for the nature of the hexanes plus; the estimation of the volume of the heptanes plus at high temperatures and pressures; the estimation of the heptanes plus equilibrium constant in the isothermal retrograde region; and the use of the differential vaporization process for determination of the residual oil in the formation-volume computations, are discussed in detail.

F. C. Benner and F. E. Bartell, of the University of Michigan, in discussing their paper, "The Effect of Polar Impurities upon Capillary and Surface Phenomena in Petroleum Production," say: "Very little data on the surface forces active at the interfaces of actual petroleum reservoirs exist. Data on surface forces obtained for interfaces of simplified sys-



Simplified Flow Diagram of the Semi-commercial Caustic-Methanol Unit.

From "Naphtha Treating Pays Its Way".

tems of pure materials must be used with caution when applied to actual production problems, because of the marked depression of interfacial tensions often caused by adsorption of polar impurities present in the crude oils of actual systems. The normally hydrophilic rock material of petroleum reservoirs, usually silica or limestone, may be greatly altered in nature, or even caused to become hydrophobic, through absorption of basic or acidic polar impurities from the crude oil. Chemisorption of basic polar compounds appears to take place at acidic silica surfaces, whereas acidic polar compounds are chemisorbed at basic limestone surfaces.

"A preliminary study of the alteration of the hydrophilic rock material made by means of contact-angle determinations indicates that a thorough study of such alteration, using a series of oil-water systems which would give a wide range of measurable and reproducible interfacial contact angles, should throw much light on actual production problems."

R. C. Mithoff, G. R. MacPherson, and F. Sipos, of Standard Oil Co. of California, in discussing, "Characteristics of California Crude Oils," gave a brief description of the crude-oil-analysis methods employed by the Standard Oil Co. of California. Based upon results of these analytical methods, California crude oils are compared with oils produced elsewhere in the United States. It is shown that the California crude oils are heavier, more viscous, substantially more naphthenic, of higher sulphur content, and of different boiling characteristics than are most Mid-Continent, Pennsylvania, and Texas crude oils. They also produce gasoline of substantially higher octane number. Description is given of the ways in which the refining requirements of California oils differ from those of eastern oils.

C. F. Mason, R. D. Bent, and J. H. McCullough, of Atlantic Refining Co., abstract their paper, "Naphtha Treating 'Pays Its Way'," thus: The caustic-methanol process removes essentially all mercaptans from sour gasolines by extracting them with only 2 per cent of strong caustic and a suitable quantity of methanol. The spent reagent is regenerated by steam-stripping and fractionation, and can be used indefinitely for mercaptan extraction. The paper presents pilot-plant studies of the extraction and regeneration steps. Data are given on reagent losses, utility consumption, control of the stability characteristics of the finished gasoline, and improvement in octane number and lead susceptibility over the untreated gasoline. The increase in leaded octane numbers of the treated products usually will offer an attractive saving in lead additions. The process is ready for full-scale application. Several large plants are under way.

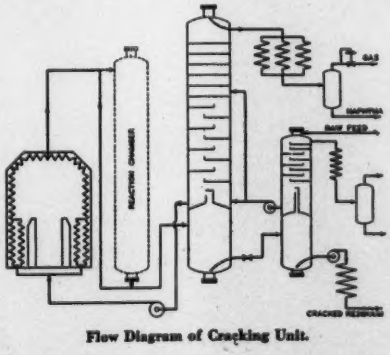
R. C. Mithoff and L. F. Schimansky, of Standard Oil Co. of California, in discussing their paper, "Reaction Chambers on Thermal Cracking Units," say: In recent years the Standard Oil Co. of California has installed auxiliary downflow reaction chambers on 8 cracking units having a total raw-feed capacity of approximately 90,000 barrels per day. The results have been highly satisfactory. In this paper correlations are presented relating reaction-chamber size with results obtained by the use of these chambers. It is shown that their use increases the severity of cracking of the gas-oil component of the raw feed, and decreases the severity of cracking of the asphaltic component. This results in production of cracked residuum of lower sediment content and increased viscosity, and of cracked gasoline with increased volatility and higher octane number. Use of chambers also results in increased plant capacity, due to decrease in the heat requirement for cracking, to reduction in tube coking, and to improved furnace conditions.

These advantages result in appreciable decrease in the manufacturing cost of cracked gasoline. It is believed that installation of additional reaction chambers on many of the cracking units in use in this country would be advantageous.

W. B. Chenault, and A. E. Miller, of Sinclair Refining Co., in their paper, "New Lubricating-Oil-Decolorizing and Clay-Reactivating Process," say: "The clay treatment of lubricating-oil stocks consists of a coordinated series of continuous operations whereby oils are decolorized and the used clay reactivated to high efficiency by extraction with solvents.

"Oil is contacted with clay in the presence of naphtha and traces of acetone at temperatures high enough to utilize the clay efficiently and to insure removal of the naphtha and acetone, but not high enough to affect adversely the nature of the coloring matter adsorbed in the clay so that its reactivation with solvents becomes difficult or impossible. The process yields finished oils meeting flash, color, and viscosity specifications without further processing. The clay is handled in the form of a slurry or cake with oil or naphtha, in the various steps of this process.

"The complete process is a closed system, and flue-gas atmosphere is provided during certain operations and in certain pieces of equipment to avoid incidental oxidation and danger of explosion or fire. The process handles all grades of stocks, and the change-over from one stock to another is simple. The process as now carried out has been in commercial operation since June, 1940, resulting in substantial savings in clay-treating costs."



Flow Diagram of Cracking Unit.

From "Reaction Chambers on Thermal Cracking Units".

Los Angeles Nomads Hosts at API Meeting

The Los Angeles Chapter of Nomads have once again proved their ability as hosts. Their Cocktail Party at the Stock Exchange Club in San Francisco, during the API convention, was one of the highlights of the Meeting. Some 350 oil men and their wives, many from foreign lands, together with the visiting members of Nomads from New York, Houston, Tulsa and Los Angeles Chapters attended, and found that the promise of E. B. Fowks, president of the Los Angeles Chapter, that a party would be given they would remember well and long, was true.

Bart J. Gillespie headed the Entertainment Committee composed of Steve Bechtel, Bill Bettis, Hi Cassidy, Elmer Decker, E. B. Fowks, Clarence Hill, Henry Pullman, Earl Reese, Ted Sutter, and Charles Toll.

Study Materials Allocation Plan

The Petroleum Coordinator, in conjunction with the Office of Production Management, is reported from Washington to be studying a program for industry wide allocations of materials needed for exploration, production, and refining of petroleum.

The move is part of a general plan instituted by Donald Nelson, priorities chief, to substitute industry allocations for the present system of individual priorities and preference ratings.

Here and There

Robert Van Acker, well known Los Angeles oil man, is now affiliated with Petroleum Management Co. in the Western Pacific Building.

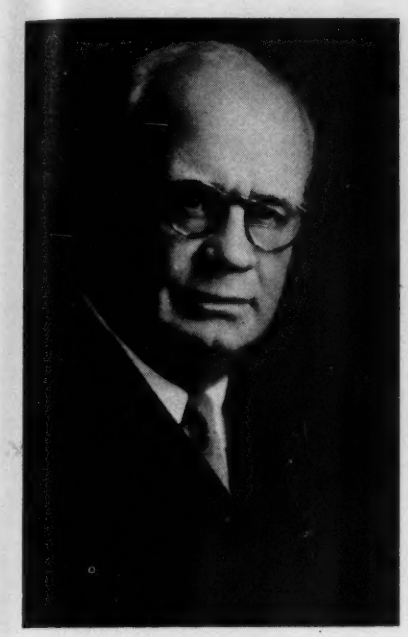
J. Paul Getty, now operating as an individual, has opened an office at 3576 Wilshire Blvd., Los Angeles. William D. Inskeep is Office Manager.

R. A. Broomfield, Sr. Ends Long Service

R. A. Broomfield, Sr., executive vice president of Barnsdall Oil Co., retired from active service on Oct. 31, 1941. Mr. Broomfield first entered the oil business as Treasurer of the Guffey Petroleum & Refining Co. in 1901 at Port Arthur, Texas. He became associated with T. N. Barnsdall, founder of the Barnsdall Oil Co., in 1903 and served in Pennsylvania and Mid-Continent fields until 1909. During the latter year he was appointed resident manager of Barnsdall's California properties and has been actively identified with the development of the petroleum industry in California since that time.

His duties as an executive of Barnsdall Oil Co. during the past 38 years have required him to travel extensively and to acquire an intimate knowledge of oil developments throughout the country. He is one of the most widely known pioneers in the industry.

Barnsdall's properties in California have been constantly enhanced by his colorful personality and his vigorous and aggressive actions. The history of his achievements closely parallels the oil development of the State. First appearing at McKittrick, he soon became well known on the board walks of that oil metropolis; from there he moved to the Midway-Sunset fields, pioneering in this locality, with the discovery of the North Midway in 1910. The Rosecrans field is credited entirely to his confidence in the possibilities of that area. Elwood is another discovery of the company he represented, as likewise is the Newhall field. All in all, Barnsdall Oil Co. has discovered seven oil fields



R. A. Broomfield, Sr.

as a result of his initiative and judgment.

The properties acquired under his management have been prolific and of long life, 75,231,383 barrels of crude oil having been produced from these properties during the 38 years that he directed the affairs of the California Division of the company.

Few men have contributed more to the industry than he, not only through his successful management of Barnsdall, but through his untiring work with the various industry associations:

Since 1924 he has been a director of the California Oil and Gas Association, serving as their president during 1929.

He was elected to the directorate of the American Petroleum Institute in 1930, and is a director of the Independent Petroleum Association of America.

He was one of the organizers of the Oil Producers Agency of California; has been a director of this association since its inception, and served as their president during the eventful N.I.R.A. days, from November, 1935, to April, 1937.

His retirement from the oil business will afford ample time to pursue his hobbies — fishing, hunting, and ranching; and most important of all, he will have time to enjoy his four young grandchildren.

W. C. Whaley Heads California Barnsdall

W. C. Whaley, who succeeded R. A. Broomfield as general manager of California operations of Barnsdall Oil Co. on November 1, is a native Californian, born in Santa Maria on April 29, 1894, whose first job was in the oil fields and who has been working in the oil industry ever since.

Mr. Whaley joined Barnsdall under Fred A. Fortine, as a driller in 1924. During his period of service with the company, he has been drilling foreman, field superintendent, general superintendent, vice president and general superintendent, and now, with the retirement of Mr. Broomfield from active service, vice president and general manager of California operations. He has been a Barnsdall director since 1940.

In addition to being vice president and general manager of his company for California, Mr. Whaley is president of the California Petroleum Safety Board, a cooperative safety group of independent oil companies; is a member of the Production Committee for District No. 5 under the Office of Petroleum Coordinator for the National Defense; is a past chairman of the Drilling Practices Committee of the American Petroleum Institute; and has been active in the voluntary conservation program of the California oil industry since its inception in 1929. At the present time he is a member of the Conservation Committee of California Oil Producers and is chairman of the Allocation Sub-Committee of that group.

His first job was with the Commercial Oil Co. in Coalinga, as a roustabout in 1911. Prior to this time, Mr. Whaley worked in the oil fields of the San Joaquin Valley for various companies while he was still attending school. His first important job was with the Honolulu Oil Co. in 1912, under the same Fred A. Fortine who later hired him for the Barnsdall Oil Co. From 1915 to 1924, with the exception of two years spent in the Army overseas, Mr. Whaley worked for various oil companies in California, Wyoming, Oklahoma, Texas, Montana and Kentucky, and spent two years in the British West Indies.

Mr. Whaley married Miss Jo Eakin in Taft in 1921, and they now have two sons. His hobbies are hunting and fishing, particularly the former. He attended school in Bakersfield and Coalinga,

W. C. Whaley

and is a Shriner and a member of the California Club.

Mr. Whaley is considered by the operators of California as an authority on drilling and production practices

Publicize Coordinator Committee Activities

An amendment to Recommendation No. 7 of the Petroleum Coordinator's Office, issued on November 3, aims at a more complete understanding of the office's attitude toward district committee and subcommittee publicity. The amendment states that "the functions of industry committees are in the public interest and are well able to undergo public examination. It is the responsibility of committees to see that the public is promptly and accurately informed as to actions taken and decisions reached. The means by which this is done is left to the discretion of the committees. It is equally the responsibility of the committees to see that other members of the industry are kept informed on discussions of proper interest to them, or on matters under consideration which would affect the operations and planning of the industry." Recommendation No. 7, issued on August 18, defined the functions and procedure of district advisory committees and has been criticized because it inferentially required that information pass through the Coordinator's office.

Asbestos shields on lifeboats of British oil tankers protect crews from torpedoed ships when surrounded by burning oil and can also be used as sails.

Twelve-man showerbaths on wheels clean up the army, also sterilize uniforms.

Progress of Petroleum Industry in California

Reviewed at A. I. M. E. Annual Meet

More than 500 members and friends of the American Institute of Mining and Metallurgical Engineers took out time during the busy final days of October to attend the annual Los Angeles meeting of the Institute, Oct. 29-30, and were rewarded with an outstanding array of contributions to the literature of the petroleum industry.

D. H. Sheldon, petroleum engineer for R. E. Havenstrite, Operator, reviewed the history of the Del Valle oil field and pointed out a number of problems connected with the development of that field, located in the north west portion of Los Angeles county embracing sections 15, 16 and 17, township 4 north; range 17 west.

The first completion in the Sherman Zone, Mr. Sheldon said, was made in R. E. Havenstrite, Operator, well No. Lincoln-2. This well has a total depth of 6220 ft. and a shut-off at 6037 ft. It was completed December 31, 1940, in a sand that had been cored but not tested in the discovery well. The initial production was 3000 bbls. a day net oil, 36 gravity, 2% cut, 650 lbs. on the tubing, and 250 lbs. on the casing, 2-1-in. beans, 3000 m.c.f. and 1000 cu. ft. per barrel gas/oil ratio.

The field had, on Aug. 1, 1941, a total past production of approximately 340,000 bbls. of oil, 25,000 bbls. of water, and 930,000 m.c.f. of gas.

Sherman Zone (Upper Producing Interval)

"The Sherman Zone, as opened to production in R. E. Havenstrite, Operator, well No. 'Lincoln-2' is considered to be the upper producing zone of the Del Valle field.

"The base of the Sherman Zone shale is approximately 300 ft. below the Pliocene-Miocene contact, as defined by foraminiferal correlations. The thickness of the zone varies from 100 ft. to 250 ft. in a south and east direction with sand bodies occupying 40% to 95% of the interval. The lenticular character of the zone as well as the individual beds make detail correlations difficult. Thus, attempts to predict the top of the producing sands have not been too successful. The use of continuous logging devices has been of benefit. The rate of penetration curve when compared with the resistivity curve of electric logs shows marked similarities. While comparison of the fluid logging units with the deep penetration curve and core records indicates reasonable correlations.

"In addition to the lateral variation in thickness, the sands show a divergence in physical characteristics. The average permeability of the Sherman sand is approximately 200 to 350 md. with some 2500 to 3000 md. values. The top sand body of the zone, 25 ft.-45 ft. thick, is coarse-grained and in some places a true conglomerate. In the latter case, the phenoclasts are quartzites and granitics with a few sandstones. Their size varies from ¼ in to 1½ in. in diameter. Although poorly sorted, the high degree of rounding has produced good porosity values. The overall average porosity is close to 28% with some sands as high as 32% to 34%.

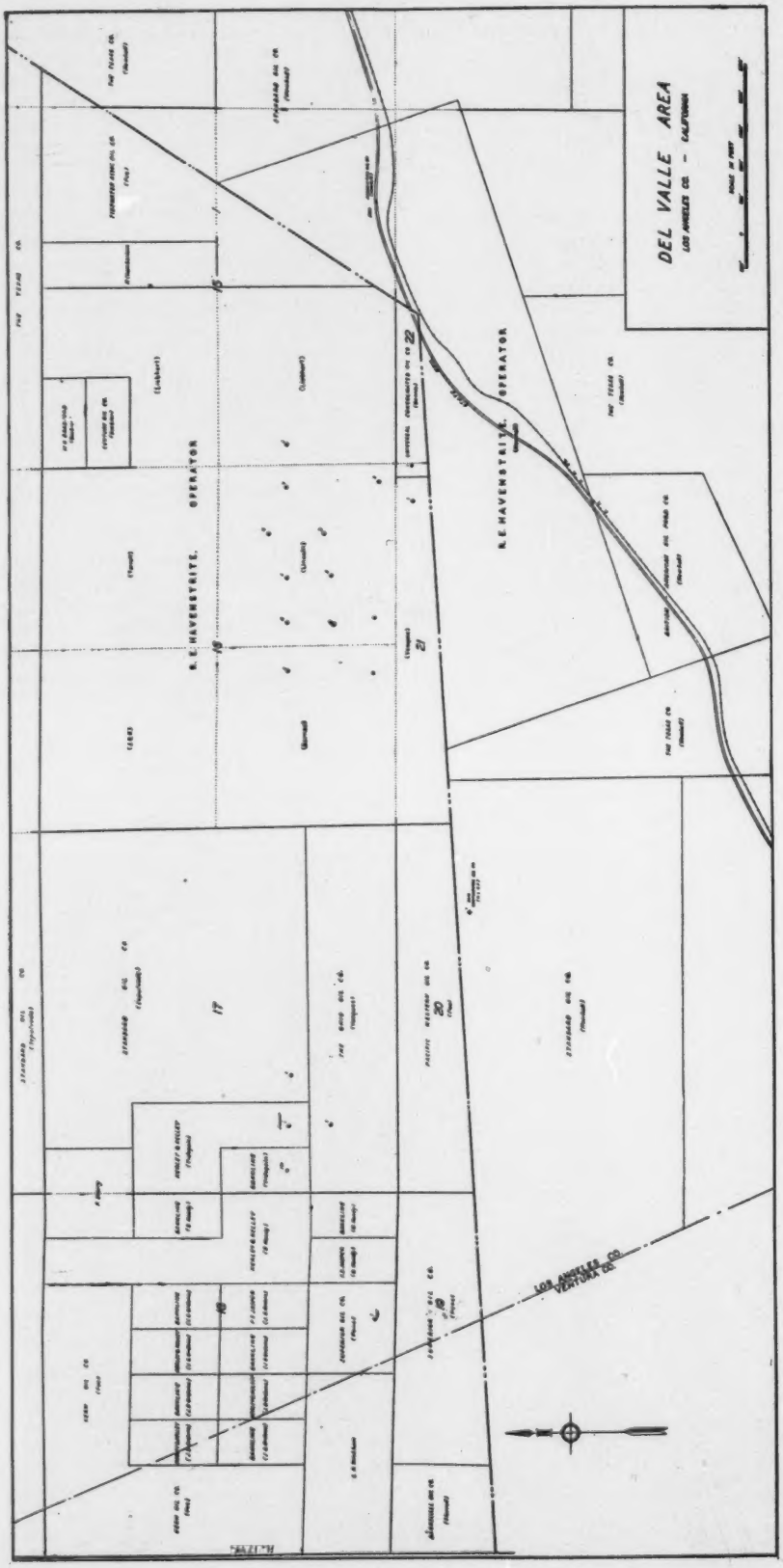
"The average of the total pore space filled with oil in the lower ranges of permeability is 16%.

"Since the bottom hole pressures in the Sherman Zone approximate the normal hydrostatic head, (i.e. 2600 lb. at 6000 ft.) and the gas-oil ratios are low (400-850 cu. ft./bbl.) an active water drive is probably present. These conditions, if appreciated with proper production practice, should result in high per acre foot recovery from the interval.

Del Valle Zone (Lower Producing Interval)

"The Del Valle Zone, as herein defined, is the interval open to production

Here is some Del Valle Topography.



in the discovery well of the field, i.e. R. E. Havenstrite, Operator, well No. 'Lincoln-1.' This zone, explored in three wells, one productive (Lincoln No. 1) and the other two barren of oil (Vasquez No. 1 and Lincoln No. 3), shows the same general characteristics as the Sherman Zone. The replacement of shales by sands to the south-east and lack of sorting are again prominent.

"The average porosity is approximately 20%. Permeabilities range from 100 md. to 1050 md. with the average about 225 md. In the gas zone, oil occupies about 7% of the total pore space, while in the oil interval this figure is raised to 13%.

"The Del Valle Zone, as has been intimated, has a free gas cap in the top 50 ft. of sand. This condition requires the segregation of the producing interval in such a manner that the production of oil and gas may be satisfactorily controlled.

Production Facilities

"The production of the discovery property is handled through separate well lead lines. These run to a central trap and tank setting. A bank of traps and a gauge tank are used for test runs on individual wells. Separate small tanks and a trap have been set to take care of production from the gas interval of the discovery well.

"The location of facilities is of importance. The abrupt changes in elevation may produce back pressures of significant amounts on weak wells should the gathering systems and tanks be poorly located.

"All wells completed to date have 'come in' flowing. All except one have had sufficient pressure to carry a 300-pound two stage system of separation.

"Dehydration problems to date have not been serious. Wet production, given sufficient settling time, is cleaned by the addition of chemical. However, with large volumes of high head waters indicated in the producing zones, the problems of separation and waste water disposal will become of major importance.

Conclusion

"In drawing this paper to a close there are several features of the Del Valle Oil Field to be emphasized.

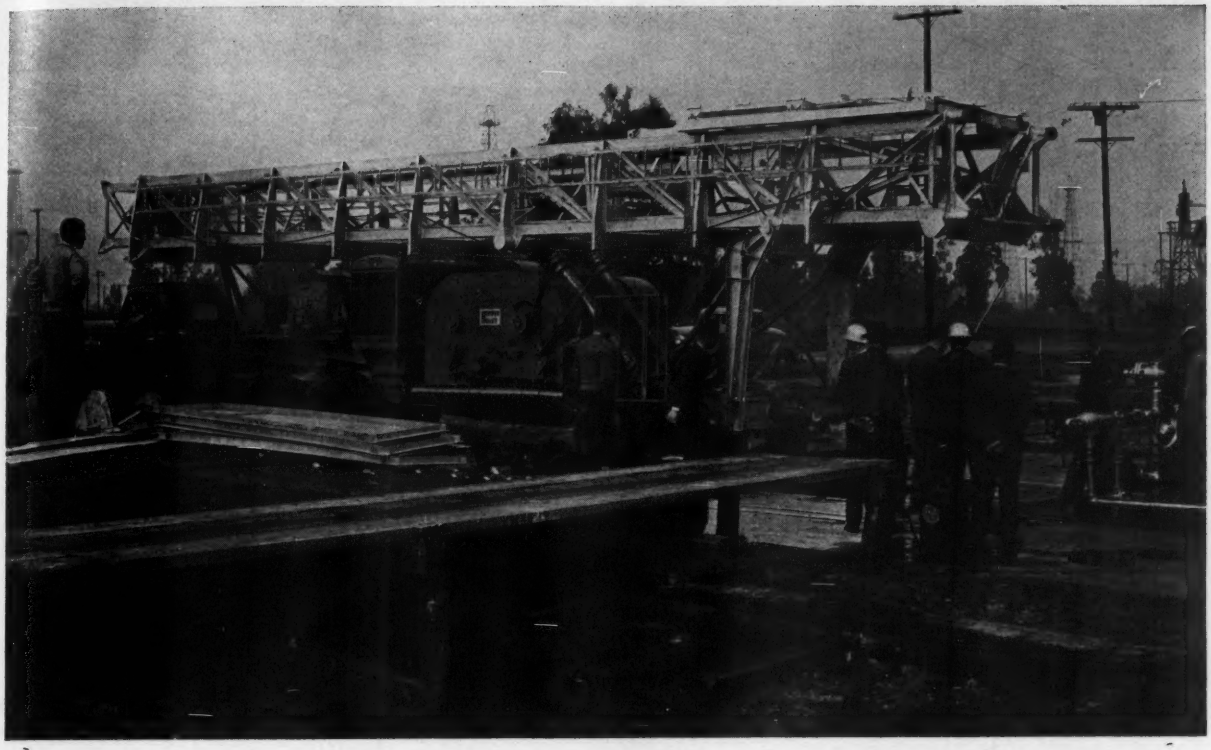
"The lenticularity of the producing sands and the resulting problems of correlation.

"The wide variation in permeability, the high porosity values and their effect on per acre foot recovery of oil in zones under different control.

"The apparent presence of an effective water drive in the Sherman Zone, and gas drive in the Del Valle Zone.

"To exploit fully these characteristics will require careful development and production practices."

T. A. Atkinson, production depart-



These folding rigs do everything but cook.

ment engineer for General Petroleum Corp., discussed the use of a portable drilling and producing rig in California. The equipment was selected primarily for the drilling of a number of 1700 to 2000 ft. wells, involving moves on the highway and for pulling tubing from 11,400 ft. wells from which most of the derricks had been removed. An investigation was made of equipment offered for these jobs, which resulted in the following general requirements being outlined:

"A. One outfit capable of doing both drilling and producing work.

"B. One portable derrick that would rack 60-foot stands of pipe.

"C. One portable mud pump, to be independent of the hoist unit.

"D. Drilling ability for 3000-foot holes with 4½-inch drill pipe to be better than anything owned, and capable of drilling slim holes to 5000 feet for exploratory work.

"E. Hoist, engine, and derrick to be as large a single unit as would meet all legal requirements for highway equipment. In California this meant, among other things, that it could not be over 60 feet long, 13 feet 6 inches high, 8 feet wide, or weigh over 68,000 pounds gross; all of these limitations including the truck.

"F. Room to rack 11,400 feet of 2-inch tubing in the derrick.

"Equipment was selected to meet these general requirements and is listed below.

"A. Drilling and production unit mounted on three-axle semi-trailer; gross weight 67,950 pounds, including derrick, hoist, engine, traveling block, drilling line, 3000-foot sand line, catline, and truck.

"1. Derrick; two-section telescoping.

"a. Working load capacity 200,000 pounds on traveling block.

"b. Vertical distance, mat to center of crown sheaves—90 feet.

"c. Collapsed length in horizontal position—51½feet.

"d. Overall width—8 feet.

"e. Overall height above highway—13 feet 5 inches.

"f. Welded construction throughout; four legs approximately equally loaded, made from 5-inch x 5-inch x ⅜-inch steel angles.

"g. Derrick raised from horizontal to vertical position by two hydraulic jacks, top section elevated by wire line; erecting mechanism powered by separate 12 horsepower engine.

"h. Derrick leans ⅞-inch per foot when in place.

"i. Ten guy wires used, two main back guys from top are ¾-inch, all others are ½-inch including four from center, two from the pipe racking platform, and two from the top.

"2. Engine

"Six cylinder, 6¼-inch bore, 6½-inch stroke, 1197 cubic inch displacement, manufacturer's horsepower rating, 210 at 1500 R.P.M., natural gas or butane carburetion.

"3. Hoist

"Two drums; 4 speeds forward, 2 speeds reverse; transmission spread from 34,500-pound line pull on bare drum in low at engine peak torque of 835 lb./ft. to a line speed of 950 ft./min. in high on bare drum at governed speed of the engine; friction clutches on each drum and rotary drive; rotary table speed of 256 RPM at maximum speed of engine.

"B. Mud Pumps

"1. Pump

"7¼-inch bore x 12-inch stroke mounted on two-axle semi-trailer with manifolds; gross weight without truck 36,400 pounds; two-speed all chain pump drive in oil tight guards; width 8 feet; height 13 feet 5 inches.

"2. Engine

"Same description as on hoist.

"C. Auxiliary Equipment.

"1. 3000-gallon butane tank trailer mounted.

"2. 100-barrel mud tank, rectangular, 8 feet wide, skid mounted; sand shaker and ditch mounted on top.

(To Be Continued)

THIS LAUGH

OFF!!

Bill Jarvis tells about the two rousties who spent the week-end at one of the Valley metropoli.

It seems that the two rousties stopped at one of the more popular hotels. They called up the girl at the desk and said to send up some Taylor whiskey, then they wondered why the girl answered: "Well, make up your mind."

Bart Gillespie told this one to a couple of other Nomads:

Pedro and Pablo were regaling each other with the merits of their respective home towns, Los Angeles and Mexico City.

"Great ceety is Mehico Ceety. The cars publicos one rides free. Not one centavo do they charge. Even the eating houses, the whole comida, eet is free, not one centavo does eet cost. Ah, Mehico Ceety, she ees grand."

"Si, Pablo, Mehico Ceety ees wonderful, so ees Los Angeles. Muy grande ees thees ceety. Not one centavo for eating, but also in the hotels, not one centavo do you pay for lodging. Food can be ordered to your room for nothing. Also, not one centavo for the wine list. And leesten, Pablo. If you are lonely, they will furnish you a companion and not one centavo do they charge for thees."

"Pedro, thees may all be true, but has it happen to you?"

"No, Pablo, not to me, but my seester, Rosita, she say eet ees true."

Speaking of priorities and such, an English newspaper recently published some extracts from letters to the Milk Officer:

"Please send me another form for cheap milk as I am expecting mother."

"Please send me a form for supply of milk for having children at reduced prices."

"I posted the form by mistake before the child was properly filled in."

"I have a baby eighteen months old, thanking you for same."

"Will you send me a form for cheap milk. I have a baby two months old, and did not know anything about it till a friend told me."

"I had intended coming to the Milk Office today but had fifteen children this morning."

"I have a child nearly two years old and looking forward to an increase in November, hoping this will suit your kind approval."

"I have a baby two years old fed entirely on cows and another four months old. Will I be able to have milk for baby as my husband finished his night watchman's job Wednesday."

"Sorry I have been so long in filling my form but I have been in bed for two weeks with my baby and did not know it was running out till the milkman told me."

King Tate picked this one up somewhere:

"Keep your temper, gentle sir," wrote the manufacturer. "Though your goods are overdue for the month, or maybe two, we can't help it, please don't swear. Labor's scarce and steel is rare; can't get rivets, can't get dies; these are facts, we tell no lies. Johnny's drafted, so is Bill; all our work is now uphill. So your order, we're afraid, may be quite a bit delayed. Still you'll get it, don't be vexed, maybe this month, maybe next. Keep on hoping, don't say die; we'll fill your order bye and bye."

Names used on this page are entirely fictitious, and any resemblance to persons either living or dead is purely coincidental.

WEIGHT INDICATOR POINTS
A plugged nickel wouldn't cover the savings you make with misleading weight readings. But accurate indications can result in more and straighter hole . . . less equipment wear . . . and lower costs.
Then why not be sure of your savings? The Martin-Decker "Sealtite" is the most accurate and complete instrument available for the practical control of every important drilling function—weight, speed, pressure and torque. With the gauges grouped right in front of the driller where they're easy to read, he'll be able to drill you a far more economical well!
MARTIN-DECKER CORP., LONG BEACH, CALIF.

Production « « « «

(Figures of Production and Stocks are in barrels of 42 Gals.)

	Total Production July	—DAILY AVERAGE— July, 1941	June, 1941	July, 1940
Group No. 1				
Arvin	18,371	592	683	1,749
Belridge—North	315,172	10,167	9,599	10,187
Belridge—South	62,936	2,030	2,000	2,152
Canal	153,839	4,962	5,006	5,543
Canfield Ranch	1,341	42	41	36
Coalinga	1,299,850	41,931	36,709	28,047
Cole's Levee	512,618	16,536	24,109	7,189
Edison	94,636	3,053	3,099	2,371
Elk Hills	300,839	9,704	11,801	12,289
Fruitvale	178,243	5,750	5,525	5,665
Greeley	212,565	6,857	6,848	4,009
Kern River	355,725	11,475	11,086	10,684
Kettleman North Dome	1,181,968	38,128	38,411	46,731
Lost Hills	108,325	3,494	3,516	3,683
McKittrick	127,808	4,123	3,639	3,593
Midway-Sunset	1,509,566	48,698	46,666	49,948
Mountain View	166,755	5,379	5,275	6,472
Mount Poso	356,666	11,505	10,449	9,151
Paloma	.....	.....	.....	507
Raisin City	4,133	133	15	.....
Rio Bravo	387,694	12,506	12,370	9,473
Round Mountain	253,216	8,168	7,339	6,939
Strand	43,828	1,414	1,499	1,580
Ten Section	454,481	14,661	14,274	9,508
Union Avenue	3,132	101	135	.....
Wasco	53,526	1,727	1,729	1,582
Wheeler Ridge	9,011	291	294	302
Group No. 2				
Capitan	72,650	2,344	2,250	1,675
Elwood	102,763	3,315	3,411	3,428
Rincon	134,657	4,343	4,243	4,633
San Miguelito	122,703	3,958	4,004	3,167
Santa Barbara	6,195	200	214	207
Santa Maria	344,191	11,103	9,806	7,262
Santa Maria Valley	563,939	18,191	17,989	18,582
Summerland	325	11	15	24
Ventura Avenue	1,091,288	35,203	34,305	34,070
Ventura-Newhall	348,031	11,227	11,000	7,393
Watsonville	775	25	25	25
Group No. 3				
Brea-Olinda	179,330	5,785	5,555	5,848
Coyote—East	121,590	3,922	3,730	4,433
Coyote—West	273,042	8,808	7,955	7,779
Dominguez	825,591	26,632	27,171	21,424
El Segundo	44,352	1,431	1,475	2,156
Huntington Beach	965,598	31,148	31,429	24,988
Inglewood	432,743	13,959	12,432	11,873
Lawndale	821	27	32	42
Long Beach	1,199,772	38,702	41,292	43,329
Los Angeles-Salt Lake	17,195	555	553	533
Montebello	391,636	12,633	14,025	18,887
Playa Del Rey	108,221	3,491	3,501	3,995
Potrero	56,383	1,819	1,924	1,532
Richfield	217,400	7,013	7,129	9,186
Rosecrans	275,672	8,893	9,175	14,190
Santa Fe Springs	720,895	23,255	23,389	26,221
Seal Beach	201,913	6,513	6,629	7,142
Torrance	267,397	8,626	8,959	10,526
Whittier	6,698	216	186	185
Wilmington	2,544,578	82,083	83,019	82,726
Total	19,804,588	638,858	638,939	616,851
June	19,168,163	638,939		
Decrease (*Increase)	636,425	81		

SUMMARY OF CALIFORNIA OILFIELD OPERATIONS FOR JULY, 1941
STOCKS HELD IN PACIFIC COAST TERRITORY
BY CALIFORNIA OIL COMPANIES

	July 31, 1941	June 30, 1941	July Changes	July 31, 1940
1. Gasoline-Bearing Crude	35,662,872	34,946,566	+ 676,306	36,116,475
2. Non-Gasoline-Bearing Crude	10,583,078	10,720,257	— 137,179	13,217,848
3. Unblended Nat. Gas	2,135,405	2,118,815	+ 15,590	2,627,668
4. Gasoline (not including distributing and service stations)	13,224,496	14,368,186	—1,143,690	14,831,909
5. Naphtha Distillates	1,802,961[1]	1,890,579[1]	— 87,618	1,888,095[1]
6. Gas Oil and Diesel Oil	11,540,120	10,848,855	+ 691,265	9,857,816
7. Fuel Oil Residuum	54,687,303	55,033,439	— 346,136	64,319,349
8. All Other Stocks	8,256,885[2]	8,440,376[2]	— 183,491	9,021,682[2]
	137,852,120	138,367,073	— 514,953	151,880,842
[1]Estimated amount of unfinished gasoline contained in item 5	1,598,545	1,704,708		1,689,155
[2]Coke included in item 8	577,484	542,214		1,208,275

WAUKESHA
EXPANDS FACILITIES

New Home for the Los Angeles Branch
IMPROVES SERVICE

● You oil men on the Pacific Coast have been using more Waukesha Engines . . . more and more. And . . . so that you may have the speediest service possible . . . the Waukesha factory branch at Los Angeles has a big new building — reception and show rooms, offices, warehouse, shops—everything it takes to insure *service!*

It's completely modern — concrete and steel, fireproof—air conditioned, flourescent lighted, and sound-silenced.

There's a 32' paved driveway and paved parking lots —north, and rear. A side door for convenient truck delivery of small parts. At the rear door trucks back into the building, and under a 3-ton traveling crane for easier loading and unloading of heavy machinery.

Nearly half the warehouse is utilized for parts storage and stock—so that Pacific Coast customers may be served day or night on a *ship-same-day* basis. A much larger stock of engines and power units is now available. Facilities for testing and repairing are greatly expanded, too.

Herbert Wirshing, district manager, his staff of Waukesha field service and sales engineers, and corps of shop men . . . all experienced oil field specialists . . . invite you to stop in and see them and inspect the new facilities for your service. Better jot down the address—it's 4927 Pacific Blvd., Los Angeles. And the phone is Kimball 2266.

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
NEW YORK TULSA LOS ANGELES

WAUKESHA ENGINES

Field Development

Los Angeles Basin

Wildcat Activity Reviewed in Basin

Still leading in exploratory interest in the Los Angeles area is the Newhall-Castaic district where two new wildcats have recently been announced. In sec. 11,3-16 northwest of the St. Anthony well which is now abandoned at 5416 ft., Airline Oil Co. has made a technical spud in Perkins No. 1 with portable equipment. The new concern, headed by V. C. Carter, plans to build a rig immediately and carry the hole as deep as necessary to adequately test the section at this point.

The second new project is that of C. G. Willis and Associates which is scheduled for the southeast quarter of sec. 36,4-17 between the idle Aztec Oil Co. well and the Newhall-Potrero field. A fault trap in the Modelo is said to be the objective.

Northeast of Del Valle, The Texas Co. is drilling Fernando No. 1 below 4250 ft. in sec. 11,4-17. Although the well has shown a little gas at times, no worthwhile indications of oil have been encountered, the Sherman sand of the nearby field not having yet been found.

Roy W. Young, Inc.'s Walker No. 1, located in Boquet Canyon, has passed the 5850 ft. mark and was last reported in shale.

Finding sands correlative with Seal Beach discouragingly low, South Basin Oil Co. abandoned S. J. B. A. No. 1 at 8014 ft. without making a test of any kind. Located two and a half miles northeast of the city of Seal Beach, the well is said to be nearly 700 ft. lower than Union Oil Co.'s Nieto No. 1, abandoned three years ago at 7000 ft. The well, a joint project of South Basin Co., A. S. Johnston Drilling Co. and Allied Petroleum Co., was located in the northeast quarter of sec. 6,5-11.

Three miles north and one mile east of the abandoned South Basin well, Midfield Petroleum Co. is planning to drill a test well at the southerly outskirts of Cypress. The site chosen is approximately a mile southwest of the duster drilled to 6079 ft. by Ohio Oil Co. a dozen years ago.

La Bolsa Rancho Oil Syndicate is slowly rigging up its well just north of Springdale School and east of the Meadowlark golf course in the Bolsa Chica area.

In a new effort to locate the long sought Anaheim district field, The

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Athens	Rankin & Williams	1	7, 3-13	9483	Idle
Castaic	O'Dell, A. J.	1	9, 4-17		Location
	Young, Roy, W., Inc., Walker	1	11, 4-16	5850	Drilling
	The Texas Co., Fernando	1	11, 4-17	4121	Drilling
Newhall	Airline Oil Co., Perkins	1	11, 3-16	50	Idle
	Aztec Oil Co., Sanborn	1	6, 3-16	6113	Idle
	Barnsdall Oil Co., Limbocher	1	17, 3-16	4041	Drilling
	Rankin & Norell, Ferguson	1	31, 4-16		Rig
	St. Anthony Oil Corp., Lassalle	1	10, 3-16	5416	Abandoned
	Willis & Assoc., Ferguson	1	36, 4-17		Foundation
Palos Verdes	Newton Dev. Co., Palos Verdes	1	13, 5-15	4215	Drilling
	Surety Holding Co.	1	22, 5-14	965	Idle
Puente Hills	Axis Pet. Co., Tandberg	1	13, 2-11		Location
	Continental Oil Co., Turnbull Comm.	1	13, 2-11	3447	Pumping
	Sunset Oil Co., Baldwin	1	11, 2-11	4681	Testing
Rio Hondo	Potrero Oil Co., Well	1	32, 1-11	125	Drilling
	Imperial Corp., Rolland Lee	1	25, 2-17		Foundation
	Shell Oil Co., Mission	2–1	25, 3-16		Grading
San Fernando	Tide Water Assoc., Mission	1	26, 3-16	6495	Drilling
Whittier-La Habra	Fullerton Oil Co., La Habra	10	25, 2-11	2780	Completed
	Los Nietos Valley Oil Co., Woodard	1	29, 2-11		Rigging up
	Union Oil Co., Sansinena	13	30, 2-10		Rig
	Orange County				
Anaheim	The Texas Co., Spencer	1	1, 4-11		Rigging up
Bolsa Chica	La Bolsa Ro. Oil Synd., Well	1	22, 5-11		Rig
Costa Mesa	Thompson, Milton N., Banning	1	9, 6-10	5649	Redrilling
Seal Beach	South Basin Oil Co., S.B.J.A.	1	6, 5-11	8014	Abandoned
	San Bernardino County				
Chino	Prado Oil Corp., Lamp	1	32, 2-7	1733	Idle

Texas Co. is rigging up Spencer No. 1 in sec. 1,4-11, a mile southeast of Buena Park. The Texas Co.'s last try in the area, two miles southeast of the present location, found oil showings but no production.

North of the east end of Montebello, Potrero Oil Co. is drilling at a shallow depth in its recently spudded wildcat in sec. 32,1-11.

East of the Aliso Canyon field, Tide Water Associated Oil Co. is drilling in hard siltstone below 6500 ft. in Mission No. 1 in sec. 26,3-16, while a mile to the east, Shell Oil Co. is preparing to drill Mission No. 2-1.

Aliso Canyon Well Seeks Deep Horizon

Having installed heavier drilling equipment at 6370 ft., Tide Water Associated Oil Co.'s Porter No. 26 at Aliso Canyon is now drilling below 7275 ft. in search of the high pressure gas and condensate horizon found in Porter No. 12 at 7550 ft. No. 26 is a westerly outpost and is reported to have found relatively poor saturation in the Porter zone. Derrick is up for Porter No. 4 and roads are being graded to the location selected for Fernando No. 1 at the east end of the field.

West Coyote Well Now Completed

Severns Drilling Co.'s McNally No. 5, located at the extreme westerly end of West Coyote, is the newest producer in that field. With bottom at 4190 ft., casing was cemented at 4120 ft. and the well completed for 75 bbls. a day of 24 gravity clean oil.

Bartholomae Drills New Coyote Project

Bartholomae Oil Corp., discoverer of the prolific deep zone at the west end of East Coyote, is drilling its No. 11 well on the Stern lease. Now below 4700 ft., the hole will be finished near the 6000 ft. level.

In the central portion of the field, Graham & Loftus Oil Corp. Perkins No. 2, an old well, was redrilled through the former producing horizon and deepened to 4687 ft. where it is standing idle.

Bankline Completes Del Valle Outpost

Extending production one location west of Herley-Kelley's Videgain No. 1 at Del Valle, Bankline Oil Co. brought in its Videgain No. 101 flowing 325 bbls. a day from the interval 6097-6132 ft. Gravity of the yield was 32 degrees and the cut averaged approximately 3.0%. A 20/64 in. bean maintained a flow pressure of 250 lbs. and a casing pressure of 1000 lbs.

In hopes of finding thicker sand bodies at greater depth, Bankline carried the hole to 7700 ft. but encountered only a few streaks of oil

Gotkool
WATER CANS
& COOLERS
GOTT Water Cans are the practical way to keep drinking water cool for long periods, protected from impurities and always handy to the job. Snug fitting large removable top, strongly built to withstand rough usage. GOTT Water Coolers have extra large covers and a handy non-leaking push button faucet. Your Supply Store has them, get one today! . . . . .
Gott
H. P. GOTT MFG. CO.
WINFIELD, KANSAS

EVEN YOUR TOUGH JOBS ARE SAFER WITH THE BOWEN SAFETY JOINT
• Factors that can spell trouble with ordinary joints—such as peak torque loads . . . bit or drill collar inertia . . . excessive vibration . . . rotating out of the hole, etc., won't phase the efficient, safe operation of the Bowen Safety Joint! It has only the simplest parts—a pin and a box section—and packers. Once made up in the pipe above the drill collar, the Joint becomes an integral part of the string—just as strong and as safe as solid pipe. Yet a simple turn or two to the left coupled with downward weight breaks the Joint and permits easy removal of the pipe in an emergency.
For drilling, fishing, reaming, testing, etc., the Bowen Safety Joint is the tool you need for protecting your string under ALL conditions. Made to standard tool joint dimensions for all popular drill pipe sizes. See your nearest Bowen Service man—or order direct today!
S-R BOWEN CO.
VALLEY FISHING TOOL CO.
Main Office—Santa Fe Springs California
Branches at Huntington Beach Ventura—Bakersfield—Avenal—Santa Maria

sand from 7490 to 7542 ft. These were not tested but may later prove to be an ace in the hole for wells in higher structural positions.

Herley-Kelley is drilling Videgain No. 2 near the 3000 ft. level and Ohio Oil Co. is below 1000 ft. in Vasquez No. 2 while Standard Oil Co. is getting under way with Sepulveda No. 2.

Remedial work is still being done by R. E. Havenstrite, Opr. in Lincoln No. 8 and Barnes No. 1 in the discovery area. Both are prolific producers but have shown a relatively high cut. Havenstrite's Leibhart No. 1, is approaching critical depths at 6000 ft. and Lincoln No. 9 is drilling at 1000 ft.

Huntington Beach Well Flows 1444 Bbls. a Day

For an initial of 1444 bbls. a day on agitated flow, Southwest Exploration Co. brought in its No. 42 on the State Tidelands at Huntington Beach. Directed under the sea from its upland surface site, the hole was drilled to 4710 ft. and finished with 8⅝ in. casing cemented at 3862 ft. and a 6⅝ in. perforated liner landed on bottom. Drilling equipment was moved to No. 43 which is now below 3500 ft.

Signal Oil & Gas Co. still is keeping one string of tools running on the Signal-Bolsa lease where No. 31B is being spudded following the completion of No. 31A.

Other activity throughout the field includes rigging up on Marfar Oil Co.'s Greer No. 1 at Five Points, Harold C. Morton's completion of No. 3 and the spudding of No. 4 on the Brooks lease, Herb Kohlbush completing Pacific American No. 9 and Standard Oil Co. redrilling Bolsa No. 20.

Derricks have been erected for West American Oil Co.'s Ashton No. 9 in the Old Field and Tronylm Oil Co.'s Surf No. 1 in the Surf area.

Hellman Testing Seal Beach Well

Hellman Estate Co. is testing its important extension well at the east end of Seal Beach after cementing casing at 5600 ft. Perforations are open at intervals below 5330 ft. in the lower Wassem Zones.

Standard, Federal & Hogan Complete Inglewood Projects

Three more wells were completed during the past fortnight in the new deep zone at the north end of Inglewood, one each being credited to Standard Oil Co., Hogan Petroleum Co. and Federal Oil Co. Largest of the trio was Standard Oil Co.'s Vickers No. 2-12, which utilizing the interval 7920-8300 ft., flowed 2226 bbls. a day of 31 gravity clean oil and 2,134,000 cu. ft. of gas through a 20/64 in. tubing bean and an 18/64 in. casing bean. Pressures behind the orifices were 600 lbs. and 750 lbs. respectively. With only an 8/64 in. tubing bean, the well flowed

D+B Barrel Tubes

Honed to a Mirror Like Finish

ASSURES STRAIGHT TRUE BORE

D+B Honed Barrel Tubes for metal plunger pumps are made of the finest seamless steel available. The inside wearing surface is honed to a smooth, mirror-like finish which eliminates all waves, scratches or other imperfections, and assures a straight, true bore in which the plunger will operate with maximum efficiency. The honing process makes possible a perfection of plunger fit that cannot be obtained in non-honed tubes.

These precision-made Honed Barrel Tubes are used with hardened cast iron or chromium plated plungers and are available in a variety of bores and lengths to suit any pumping condition. Each end of the tubes is accurately threaded to receive the fittings, insuring a straight, true pump assembly that will give long, satisfactory service. Write for additional information.

D+B

HONED BARREL TUBES for Metal Plunger Pumps

D+B DIVISION

EMSCO DERRICK & EQUIPMENT CO.

Plants: LOS ANGELES DALLAS

364 bbls. of oil and 268,000 cu. ft. of gas with tubing and casing pressures equalized at 1900 lbs.

Federal Oil Co.'s Smith No. 2, a noncommercial well at 8175 ft., was redrilled from 7860 ft. and deepened to 8292 ft. where it was brought in at the rate of 180 bbls. a day through a 10/64 in. bean. Present production approximates 150 bbls. daily through a 6/64 in. bean.

Establishing itself as one of the field's better producers, Hogan's Machado No. 3-A initialled 1900 bbls. a day through a half inch bean with 800 lbs. flow pressure. Recent figures give the well 238 bbls. through a 2/64 in. orifice.

At present, Tide Water Associated Oil Co. is drilling Vickers No. 72 below 7000 ft., is preparing to drill No. 71 and is redrilling No. 53 to the old shallow zones. The Texas Co. is redrilling R. C. Smith No. 8 below 7200 ft. and Hogan Petroleum Co. is getting ready to drill Machado No. 4-A.

R. E. Havenstrite's Barnes No. 1 at Del Valle created quite a stir recently when, on morning tour, it started blowing gas around the casing from a shallow zone. By 8:30 a.m. when this picture was snapped by warehouseman Roger E. Rabe, the gas had traveled through surface sands and was blowing dust and dirt 75 ft. into the air from a crater in the floor of San Martinez Grande Canyon. Control was effected shortly after this by perforating the 7-in. casing and cementing at 1900 ft.

Barnsdall Extends Newhall-Potrero Area

Extending its wholly owned Newhall-Potrero field one location to the northwest, Barnsdall Oil Co. completed Rancho San Francisco No. 27 flowing 1621 bbls. a day of 33.5 gravity clean oil through a 32/64 in. bean. 1,060,000 cu. ft. of gas accompanied the flow. Indicating that limits in this direction are not yet in sight, the Third Zone was topped at 7050 ft. and penetrated to 7301 ft.

R. S. F. No. 26, mystery flank well, is still undergoing a series of tests to determine its productive possibilities in the Third Zone interval 7470-7830 ft.

Earthquake Damages Dominguez Producers

Although the light earthquake of the night of October 21 furnished little more than a thrill for tourists, it was a hard blow to the west end of the Dominguez field where subsurface movement sheared the casing in 11 wells on Union Oil Co.'s Callender lease and four on R. E. Havenstrite's Larronde property. The depths at which the movement occurred varied from 5500 to 6500 ft. from well to well and there is a strong possibility that other wells may be affected, but not to the extent of stopping production as in the 15 that were entirely killed. At present, Union Oil Co. is redrilling Callender Nos. 72 and 80 and Havenstrite is going into Larronde No. 4.

Finding nothing of commercial importance, Union Oil Co. abandoned Carson No. 17, southerly outpost well, at 9472 ft. The Eighth Callender zone, reportedly topped at 8400 ft., was barren. This is said to have put a damper on contemplated new activity at the southwest corner of Avalon Blvd. and Victoria Ave.

Union Oil Co. is nearing completion in Austin No. 8 in the westerly section and Shell Oil Co. is preparing to drill No. 128 on the Reyes lease in the central area.

Universal Finishes Deep Rosecrans Well

Universal Consolidated Oil Co. satisfactorily recompleted Trust No. 2 at Rosecrans in the Eighth Zone flowing 335 bbls. a day of 30 gravity clean oil. The hole had been deepened to 8183 ft. from the O'Dea zone where it had produced for several years.

O'Dea No. 21, Barnsdall Oil Co.'s first new Rosecrans well in some time, is drilling below 5000 ft. while in the Athens area, J. Paul Getty is drilling at approximately the same depth. On completing O'Dea No. 21, Barnsdall will drill Trust No. 7 north and east of the intersection of Rosecrans Ave. and Figueroa St.

Production Increased In Turnbull Canyon Well

Continental Oil Co.'s Turnbull Community No. 1, sec. 1, 2-11, was treated with 3000 gallons of chemical increasing fluid production from less than 100 bbls. a day to over 400 bbls. Disconcerting, however, is the fact that the cut jumped from less than one per cent to around 30%. The hole is 3447 ft. deep with 7 in. cemented at 270 ft. and a 5½-in. liner including 70 ft. perforated landed on bottom and cemented through perforations at 3373 ft. Before setting casing, a drill stem test was made of the interval between the cementing points which resulted in a large recovery of fluid which cut 50% brackish water. Perhaps the secondary cement job has failed accounting for the large increase in both oil and water.

Sunset Oil Co.'s Baldwin No. 1, located two miles northwest of the Continental well, is perforating and testing in an effort to isolate a productive sand. Several intervals tested so far have yielded relatively clean oil but none have been of commercial value.

San Joaquin Valley

Amerada Discovery Makes Good Flow Trial

Amerada Pet. Corp.'s Helm Area discovery, Clover No. 31-34, in sec. 34,16-17 was given its delayed flow test on October 31 to physically demonstrate the value of the high gravity condensate sands previously proved productive on short tests.

The trial marked up a 662 bbl. daily rate of 64.7 gravity distillate through an 82/64 in. bean with 1000 lbs. on the tubing. The gas was metered at a 13,618,000 cu. ft. rate. Upon completion of the trial the well was shut in pending the completion of handling facilities.

Located 10 miles south and a little west of the Raisin City field, the discovery was made with the hole plugged to 8005 ft. after drilling to what was reported as barren Cretaceous at 10,257 ft.

Generally conceded to be an important addition to California's petroleum reserves, and more particularly recognized as another important discovery in central Fresno county, the new area is expected to have orderly but consistent development.

Preparing to enter the plan on the westerly adjacent section 33, General Petroleum Corp. has staked location for Esperoade No. 75-33.

Seaboard Oil Completes Joint Raisin City Well

In charge of operations but collaborating with Tide Water Assoc. and Union Oil Companies, Seaboard Oil Corp. completed S.T.U. No. 88-13 in sec. 13,15-17 of the Raisin City field flowing 355 bbls. of 24.9 gravity oil from 5139 ft. The production, first to be obtained by anyone except Shell Oil Co., was clean and was made under wraps, a 20/64 in. orifice being employed. When last reported the well was making 472 bbls. of 24.9 gravity oil through a 25/64 in. bean. Pressures were 480 lbs. on the tubing and 280 lbs. on the casing while the gas was measured at 168,000 cu. ft.

The operators have already carried their second well, No. 77-13, to 4299 ft. on an adjacent location.

Shell Oil Co.'s latest well in the field, Santa Ana & Fresno Land No. 31-19 in sec. 19,15-18, was last reported at 4116 ft.

South of the present proved limits of the new field, Bandini Pet. Co.'s outpost try in sec. 23,15-17 was abandoned in gray sand at 6546 ft. after finding the Kreyenhagen at 6059 ft. and entering barren Eocene at 6418 ft.

Nearer field production on the next easterly section 24, Barnsdall Oil Co. has erected rig to drill Ripperdam No. 71-24 as the area's next outpost try.

Herndon Quits Fresno Co. "Cat"

Some twelve miles northwest of the Raisin City area, in sec. 3,14-16, Sam B. Herndon, Operator, has abandoned a syndicate wildcat at 5571 ft. Known as Bottoms No. 1, the test is believed to have been in barren Eocene topped at 5100 ft. when put on the hook.

Riverdale "Cat" Below 6000 Feet

In the Riverdale area some 14 miles northwest of the city of Hanford and just inside the Fresno county line Amerada Pet. Corp. is continuing the Fresno county exploration proved so profitable in recent months. The current wildcat, Lawton No. 45-26 in sec. 26,17-19, was

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Helm	Amerada Pet. Co., Clover	1	34, 16-17	10257	Shut in
	General Pet. Corp., Esperoad	75–33	33, 16-17		Location
Jacalitos Hills	Wilshire Annex Oil Co.	21-26E	26, 3-15		Location
Raisin City	Bandini Pet. Co., S. P.	82–23	23, 15-17	6546	Abandoned
	Herndon, Jas. B., Op., Bottoms	1	3, 14-16	5571	Abandoned
	Seaboard-T.W.A.-Union, S.T.U.	77–13	13, 15-17	4300	Drilling
	Shell Oil Co., Inc., Santa Ana and Fresno Land	31–19	19, 15-18	4116	Drilling
Riverdale	Amerada Pet. Corp., Lawton	45–26	26, 17-19	6024	Drilling
	Kern County				
Belridge—South	Section 27 Oil Co., Aslin	1	27, 28-22	1390	Idle
	Parkford, E. A., Parkford	1	12, 29-21	1140	Testing
	Sentinel Oil Co.	1	10, 28-20	3902	Idle
Devils Den	Morton, H. C., Core Hole	1	30, 26-19	2220	Testing
Grapevine	Kern Line Oil Co.	1	19, 11-19	8390	Idle
Kern Front	Richfield Oil Corp., Kramer	1	34, 28-27	7223	Drilling
McClung	Macrate, A. N., Haberfelde	1	32, 29-26	11226	Drilling
Mt. Poso	Alpha Oil Co., C. V. Elliott	1	1, 27-28	741	Drilling
	Bishop, Bradford	1	22, 27-28	1432	Idle
Paloma	Western Gulf Oil Co., Symons	12–7	7, 32-27	11480	Drilling
Richgrove	Shell Oil Co., Bell	52–27	21, 25-26	6339	Abandoned
	Shell Oil Co., Smith Cairns	2	11, 26-27	2491	Abandoned
		3	11, 26-27		Location
Round Mt.	Pankratz, J., J.P.R., Coffee	1	2, 28-28	2065	Abandoned
Shafter	Continental Oil Co., KCL	C–2	35, 27-24	12934	Re-testing
	General Pet. Corp., S.P.	51–15	15, 28-24	12011	Drilling
Shale Hills	The Texas Co., Anderson, Inc.	1	19, 28-20	5411	Drilling
	Tideland Oil Co., Grant Est.	1	4, 27-18	927	Drilling
Union Avenue	Hancock Oil Co., Roberts	3	6, 30-28	3536	Drilling
	Kings County				
Kettleman Hills	Mid-Kettleman Co., Bunting	1	25, 23-18	9138	Testing
	Tulare County				
Kingsburg	Goble, W. E., Goble	1	28, 16-23	497	Drilling
Terra Bella	Stout, Geo. W., Stout	2	11, 23-27	744	Testing
Trico	Trico Oil & Gas Co., Seymour-Bolz	1	20, 24-23		Rig

last reported at 6024 ft. without having announced showings.

Western Gulf Oil Cores Paloma Condensate Sand

In the northeast corner of sec. 7, 32-27, a mile east of present Paloma production, Western Gulf Oil Co.'s Symons No. 12-7 is coring light oil sand at 11,480 ft., a zone which was located by ditch sample at 11,270 ft.

Although tight and fine grained, the sands are expected to equal the condensate production found by Western Gulf in the discovery area.

Already geographically large, the field is indicated to be of immense proportions by this large addition to known sands. Although the zone now being taken is much lower than the nearest production, there is yet no evidence that it will not have the "wallop" customary in Paloma completions.

The first sands in this outpost were cored from 10,939 to 10,990 ft. at which point the well was already 688 ft. stratigraphically lower than the first sands in the most easterly producer, Western Gulf Oil Co.'s own KCL No. B-12-12 which also extended the field a mile when it was drilled as an outpost.

Wilshire Annex Starts Jacalitos Hills Well

Wilshire Annex Oil Co. is preparing to drill No. 21-26E approximately 1500 ft. northwest of its No. 33-26E, discovery well in the Jacalitos area. Located in sec. 26, 21-15 the strike lies five miles southeast of the Coalinga townsite and seven miles west of the north tip of the Kettleman North Dome field.

The discovery was made in the Temblor horizon when No. 33-26E was completed pumping 100 bbls. of clean 40.2 gravity oil from plugged depth of 3905 ft. Bottomed in barren Cretaceous at 6031 ft. the well was finished from 20 ft. of formation in the Upper Temblor section which was 60% good oil sand.

Shell Abandons Dyer Creek Try

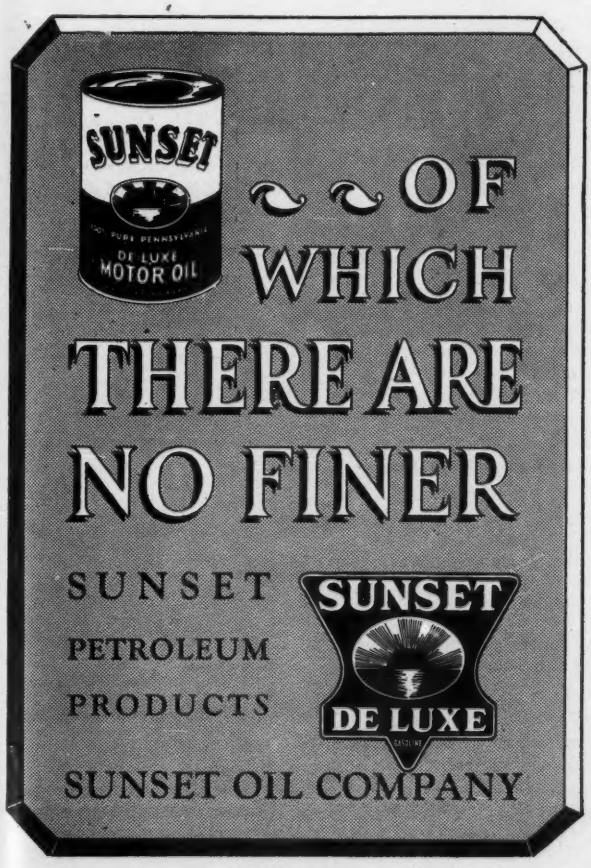
Shell Oil Co.'s attempt to duplicate the shallow pumper No. 56--11, in sec. 11,26-27, failed when Smith Cairns No. 2 was abandoned at 2491 ft. Poor Vedder sands were found at 2287 ft., 22 ft. lower than in the discovery well one location to the southeast.

Shell is preparing to try again approximately 500 ft. south of the discovery well, having already poured foundation for Smith-Cairns No. 3.

Kern Front Outpost Now Deep in Section

Richfield Oil Corp.'s Kramer No. 1, in sec. 34,28-27 a mile south of the Kern Front field, was last reported at 7323 ft. after finding the top of the Eocene at approximately 7200 ft.

Drilled in a spirit of exploration, the wildcat is expected to find either production or basement before the drill is stopped. Thus far no showings have been reported.



SANTA BARBARA OIL PROPERTY
—IN NEW SECTION—

FOR SALE—60-acre lease, containing 6 producing wells, in shallow field. Average daily yield per well of 14 bbls. of 15 gravity oil. Annual production under contract to an oil company. Lease clear from obligations.

DEEP TEST permit granted and derrick erected. Sump dug and water lines laid to rig.

EQUIPMENT on property. 6 Oilwell pumping units. 136-ft. derrick. 3 70-h.p. boilers. No. 7 drawworks. 4-in. & 6-in. kellys. 2200 ft. 4-in. drill pipe. Well pulling unit mounted on Mack truck. 1-ton Chevrolet flat body truck. 4 1000-bbl. bolted steel tanks. 2 500-bbl. butt welded tanks. 1 new electric shipping pump.

REPRESENTATIVE on premises.

H. E. WALLACE—Supt.
1225 Cliff Drive
Santa Barbara, Calif.

PHONE: Santa Barbara 4377

Coastal District

O. C. Field Plans New Casmalia Well

O. C. Field Gasoline Co., most active independent operator in the Santa Maria area, is planning to drill another well on the Righetti lease in sec. 13,9-35 near Casmalia. His first well on the property was completed in 1935 at 1745 ft. for 275 bbls. of 12 gravity oil.

Bell Cleans Out Old Lompoc Well

Alphonzo E. Bell Corp., which controls large acreage in the old Lompoc field, has taken over the Sun-Bell Drilling Co. well in sec. 29, 8-34 and is cleaning it out to determine its productive possibilities. If the findings warrant, the hole will be reconditioned and put on production.

Standard to Finish 3rd at Cat Canyon

Scheduled for early completion is Standard Oil Co.'s third well on the Los Flores Land & Oil lease in sec. 27,9-33 where deep Monterey production has recently been developed. Casing has been cemented at 5545 ft., the top of the Chert zone, and when last reported a liner was being run to complete at 6100 ft.

Union Oil Co. has derricks up for Nos. 12 and 13 on its adjoining Bell property.

Petrol Corp. Resumes Gato Ridge Activity

Reflecting better markets for heavy oils, The Petrol Corp. is preparing to drill Magenheimer No. 661 in the Gato Ridge field. The work has been contracted to the Long Beach drilling firm of Dunlap & Graham.

O. C. Field Testing Santa Maria Outpost

With bottom at 5500 ft. and casing set at 5220 ft., O. C. Field Gasoline Co. Brown No. 1 is completing as a westerly outpost to the Santa Maria Valley field. The well is located in the northeasterly corner of the John A. Brown property in projected section 15,10-35, and if successful, will constitute an extension of present productive limits.

Southwestern Development Co. was unsuccessful in obtaining production in Mendoza No. 1 at the north edge of the field in sec. 13,10-34 and has suspended operations after testing the interval 1554-1683 ft. Less than 100 ft. of Miocene was encountered above the Franciscan basement which was topped at 1663 ft.

Believing that further drilling will develop better production in the extreme southeasterly portion of the field, Rock Island Oil Co. is reported preparing to drill Kemp No. Two-1 in sec. 31,10-33.

Recent good completions include Geo. F. Getty, Inc.'s Vicente No. 3 in sec. 27,10-34, Pacific Western Oil Co.'s Hobbs No. 7 in sec. 21,10-34 and A. N. Macrate & Sons' Fernandez No. 3 in sec. 26,10-34.

Ventura Wildcat Development Told

Encouraging reports have been received of late from Hopland Oil Co.'s Wiley Canyon test on Oakridge Anticline, in sec. 1,3-19, east of the Shiells Canyon field. Still in Sespe, at 4075 ft., the well is said to have found promising streaks of

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
Santa Barbara County					
Cat Canyon	Alphonzo E. Bell Corp., Gilmore	1	23, 9-33	6178	Drilling
Lompoc	O. C. Field Gasoline Co., Careaga	1	31, 8-33	4986	Abandoned
San Luis Obispo County					
Huasna	Tex Harvey Oil Corp., Gilmore Comm.	2	11, 32-14	7238	Idle
Ventura County					
Bardsdale	Calzoil Co., San Marino	1	7, 3-19		Location
	Hopland Oil Co., Well	1	1, 3-19	4075	Drilling
	Ventura Southern Oil Co.	G–1	19, 3-19		Rigging up
Camulos	Western Gulf Oil Co., Rubel	1	27, 4-18	7096	Abandoned
Conejo	Sycamore Oil Co., Boylan	1	23, 1-20	1465	Drilling
Ojai	Oil Prod. Maintenance, Inc., Byhara	1	12, 4-22	1535	Drilling
Piru	Pacific Western Oil Co., Temescal	11	4, 4-18		Grading roads
Sespe	Inter Counties Fuel Co.	1A	22, 4-19	1200	Idle
	Ivers, H. A., Kentuck	13½	1, 4-20	865	Drilling
	McCaslin, W. E., Burson	1	19, 4-19	2039	Idle
	Rio Hondo Oil Co., Cosby	1	14, 4-19	1695	Idle
South Mountain	Comstock Pet. Co.	1	17, 3-29	2250	Idle
	Loose, E. H., & Dietzmann, J.	1	17, 3-20	4200	Drilling
Timber Canyon	Denison, A. T., Denison	1	13, 4-21	200	Drilling
	Crude Oils, Inc., West	1	19, 4-20	900	Drilling
	Henderson-Ortez Oil Co., O'Leary	1	29, 4-20		Rigging up

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Alameda	Shell Oil Co., Nissen	1	7, 2s-3e	5910	Redrilling
Colusa	Pacific National Pet. Corp.	1	17, 17n-4w		Rig
Madera	Blake, T. E.	2	22, 10s-17e		Foundation
	Shell Oil Co., Chowchilla Farms	74–9	9, 11s-14e	9062	Abandoned
Mendocino	Keyt, N. F.	1	3, 12n-17w	1740	No report
Monterey	Loma Grande Oil Co., Corey	1	23, 24s-10e	3695	No report
Sacramento	Standard Oil Co., Prod. Prpties	1	23, 3n-3e	6292	Abandoned
Sutter	Buttes Oilfields, Inc.	7	3, 15n-1e	300	Drilling
San Benito	The Texas Co., Carter	1	3, 17s-12e		Grade
San Joaquin	Standard Oil Co., Blewett	3	23, 3s-6e		Location
Solano	Standard Oil Co., Suisun Comm.	1	36, 4n-2w	5395	Abandoned
	Standard Oil Co., Tippetts	1–1	15, 12n-3w	2490	Abandoned

sand below 4036 ft. but no tests of any kind have yet been made.

Recovering from a fishing job at 1400 ft., Sycamore Oil Co. is drilling ahead in brown shale with occasional oil showings below 1500 ft. The well is located in Sycamore Canyon in sec. 23,1s-20w near the north Malibu coast.

Ventura Southern Oil Co., headed by R. S. McKeon, plans to get under way soon in McCampbell No. G-1, sec. 19,3-19 in Grimes Canyon. The derrick has been completed and equipment should be moved in by the time this is read.

Abbott & Associates are drilling a core hole at approximately 900 ft. in sec. 33,2-19 near Conejo.

Oil Production Maintenance, Inc., Byhara No. 1, in sec. 12,-4-22 near Ojai, bottomed at 1535 ft. and is preparing to test several intervals below the casing shoe at 540 ft.

In Timber Canyon, Crude Oils, Inc. is drilling below 900 ft. in blue shale.

Deep Rincon Well Flows Small Rate

Much disappointment was felt when Chanslor-Canfield Midway Oil Co.'s Hobson No. C-3 at Rincon flowed only 125 bbls. a day by heads on an open hole production test. Plugged from 10,515 to 10,080 ft., the hole was open below the shoe of the 7-in. water string at 9048 ft. Gravity of the oil approximated 25 degrees and the cut was estimated at 30 per cent. Next move on the well is uncertain as drill pipe was stuck in the hole at last reports.

Hobson No. C-9, the company's first deep try, was plugged to 7750 ft. after a pumping trial with the hole open to bottom at 9337 ft. resulted in very small production. At present equipment is being repaired after a gas blow out and fire damaged the rig.

Seeking production in the established shallow zones, Bond Development Corp. is drilling Rincon No. 1 below 3500 ft. on the north flank of the field. Petroleum Management Corp. is now affiliated with the project.

Harvey Suspends Huasna Activity

"Tex" Harvey Oil Corp. has suspended operations in Gilmore Community No. 2 at Huasna after drilling to 7238 ft. and making a three-day swabbing test during which practically no fluid entered the hole. Some gas, however, was in evidence during the test. Formation at bottom was reported as red and green sands below the Vaqueros. This well, located in sec. 11,32-14, appears to have made the greatest stratigraphic penetration of any well yet drilled in the Huasna Valley, the majority of former tests having stopped while yet in Monterey.

Call Emco Executives For Military Service

Col. W. F. Rockwell

Three executives of the Pittsburgh Equitable Meter Company have recently been called for active military duty in different branches of the service.

Colonel W. F. Rockwell, president of the company, was called for extended active service early in October, reporting to Washington, D. C., where he has been serving as Assistant to the Chief of the Motor Transport Division.

Captain A. E. Higgins, vice president of the company, originally called in midsummer for active duty in the Air Corps, has been temporarily deferred due to certain National Defense activities in which the Pittsburgh firm is engaged.

For the past eight months, Captain J. R. Sproat of the Sales Staff has been serving with the 176th Field Artillery in command of Battery "F" at Fort Meade.

Cat Canyon Well Sidetracks Fish

Alphonzo E. Bell Corp.'s Gilmore No. 1, deep test at the north end of the old Cat Canyon field in sec. 23, 9-33, is sidetracking a fish to take a few cores below present bottom at 6178 ft. before making a production test. At present more than 1200 ft. of Monterey has been penetrated and the well looks like it has a good chance of becoming a producer.

W. Gulf Abandons Camulos Wildcat

Finding no important showings to 7096 ft., Western Gulf Oil Co. abandoned Rubel No. 1 near Camulos station on the Southern Pacific-Santa Clara Valley line. Formation at bottom was steeply dipping hard shale.

It's a blue-ribbon JENSEN using a 5 H.P. motor to lift oil with fourteen 34" strokes per minute from 3600'. Smooth and dependable, with a long record for low-cost performance.

PUT YOUR MONEY ON PERFORMANCE

Horse or pumping unit, it's well to check the record before you place your bet. You can't tell how well either will run by the way it looks.

The record shows that no JENSEN JACK has ever lost a long race when the goal was LOW COST PER BARREL. These units measure up to the best traditions of pumping equipment that has been a blue-ribbon line for more than 22 years.

If you play to WIN, get in touch with our California representative . . .

A. V. TURNER
445 W. 6th, Downey, Calif.
Phone: Downey 47478

JENSEN
BROTHERS MANUFACTURING CO.
Coffeyville, Kansas, U. S. A.

For detailed JENSEN JACK description and specifications, see . . . PRODUCING EQUIPMENT DIRECTORY or COMPOSITE CATALOG.

EXPORT OFFICE: 50 Church St., New York City

At the Oil Tool Corp. plant, new Stocking Dealer for Jensen Brothers Mfg. Co., there's plenty of help on pumping problems.

Oil Tool Corp. Appointed Jensen Bros. Stock Dealer

The Oil Tool Corp., 3035 Cherry Ave., Long Beach, Calif., has been appointed a **Stocking Dealer** by Jensen Brothers Manufacturing Co., for the sale of Jensen Pumping Units.

A complete stock of pumping equipment and parts is being maintained as far as possible under present conditions. Operators interested in pumping equipment are asked by The Oil Tool Corp. to communicate with the address given above, or with A. V. Turner, 445 West Sixth St., Downey, Calif., Jensen Brothers Manufacturing Co.'s Pacific Coast representative.

Jensen Brothers points out that those purchasing from The Oil Tool Corp. stock will enjoy the same advantages as those making factory purchases. Discounts are the same, and in addition to the advantage of stock delivery there is a saving on freight on local purchases because large purchases by The Oil Tool Corp. enable them to secure the best possible freight rates. With factory deliveries slowed down to a snail pace, Jensen Brothers believes that the appointment of The Oil Tool Corp. as a stocking dealer in this territory is a distinct service to the industry.

Gold Seal Tank Corp. Now Columbia Welding & Mfg. Co.

R. C. "Hoppy" Hopkins, who recently became sole owner of Gold Seal Tank Corp. through purchase of the interest held by L. L. Eccles, announces change of the name of the corporation to Columbia Welding & Manufacturing Co., with headquarters at 3249 Cherry Ave., Long Beach, Calif.

"Hoppy" Hopkins traces his oil industry experience back to 1911, when he was office boy for J. C. Anderson and E. L. Doheny, then of American Petroleum and Mexican Petroleum companies. Later he was with Charley Chandler and W. D. Stewart, of The Texas Co., and with George Barry of Superior. When he went to Fellows in the field offices of American Oilfields Co., he worked under Tom O'Donnell. His next boss was L. J. King, of Associated Oil Co.

For the ensuing ten years he worked as tool dresser, roughneck and rotary driller. For 12 years he was with Oil Tool Corp. He built and installed Sonner Air Cooled Gas Burners in the first 350 and 500-pound pressure boilers in California. This was the first high capacity portable burner applicable to these high pressure boilers. "Hoppy" is president of Oilfields Service Association.

Franks Mfg. Corp. Tenth Anniversary

A decade of pioneering is the record of the Franks Manufacturing Corp. of Tulsa, which this year is celebrating its tenth anniversary as the manufacturer who pioneered in putting the oil industry "on wheels" through the development of portable drilling and well servicing units.

The firm got its start in 1930 when its founders, H. H. Franks and Carl White, Jr., conceived the idea of building a power take-off to fit every truck for the powering of hoist or winch well servicing units—an idea unheard of until then, firm engineers say.

Second pioneering step of the new firm was to develop and build a final friction drive well servicing winch.

From then on beginning with these two basic ideas—Franks has continued to

The Oil Tool Corp. did not want to run out of Jensen Jacks too soon.

pioneer throughout a decade—introducing "slim-hole" portable rotary drilling units mounted on trucks and capable of drilling to 5,000 feet; the "open face" portable telescoping derrick servicing unit with a 54-ft. over-the-road length and a 90-ft. height when fully telescoped to permit the stacking of doubles, for servicing to 10,000 feet; a convertible "open face" derrick, skid-mounted, for drilling to 8,000 feet.

All Franks units have been designed for maximum balance, economy, and portability. They have been constructed for the fastest rig-up, tear-down, and location-to-location moving possible in a portable unit. Further savings have been made possible in fuel, labor, water, moving, and casing through the introduction of small holes—and units built with the derrick as an integral part have eliminated the need and cost of permanent derricks for drilling or well servicing.

While the development of a light and strong derrick was in itself an important pioneering step, Franks also had to design and build such equipment and accessories as a propeller-shaft drive rotary table, shorter swivels and other "short-cuts" to obtain the greatest possible economy of space.

One of the most interesting features about the business is the fact that the company turned to aircraft engineers for the designing of equipment which necessarily needed to follow a basic principle of airplane design—maximum strength with minimum weight.

Drilling and well servicing units built by the Franks Manufacturing Corporation are in use in all important United States oil fields as well as in Peru, Venezuela, Russia, Roumania and Greece.

Hillman-Kelley, Inc., 2439 Hunter St., Los Angeles, is California representative for Franks Manufacturing Corp.

Special Defense Clinic Train to Come to Coast

Bound for the Pacific Coast, the "Red, White and Blue" special train, sponsored by the Contract Distribution Division of the Office of Production Management, is scheduled to leave Washington, D. C., on Nov. 10.

In the Far West the first scheduled stop is at Boise, Idaho, on Nov. 18. The remainder of the schedule to date is: Spokane, Wash., Nov. 19; Seattle, Wash., Nov. 21 and 22; Portland, Ore., Nov. 24; Sacramento, Nov. 26; San Diego, Nov. 27 and 28; Phoenix, Ariz., Nov. 29.

Manufacturers may obtain admission to the train by writing to the field offices of the Contract Distribution Division at San Francisco, Los Angeles, Spokane, Portland, or Seattle.

One of three trains to tour the nation, the train coming to the Pacific Coast will carry officials and exhibits from the Army, Navy, Maritime Commission and the OPM. The tour is one of the methods adopted by the OPM to spread defense work quickly into qualified plants, it was stated by Floyd B. Odlum, Director of the Contract Distribution Division.

Each train will consist of six cars equipped with defense "samples" and conference tables, and two cars providing living quarters for government representatives.

Republic Supply Co. Announces Promotions

W. L. Duhig has been elected executive vice president of Republic Supply Co. of California. Other promotions announced following a meeting of the board of directors are: J. J. Pike, elected vice president; E. Fewtrell, elected manager of purchases, and H. C. White, elected manager of stores.

W. L. Duhig

J. J. Pike

Walter Duhig, as executive vice president, will continue to direct the company's sales efforts, with added duties of an executive nature.

Jack Pike, son of the founder of the company, P. Mn. Pike, has been associated with Republic since 1933, having worked in all departments of the company, and is being advanced to vice president from his position as manager of purchases and stores. He will supervise these departments and also become active in sales work.

E. Fewtrell is an "old-timer" with Republic. He joined the organization in 1921 and has been active in purchasing duties. His advancement to manager of that department is in recognition of his fine work and long experience with the company.

Herb White, manager of stores, started with the company in 1925 and has many friends throughout the industry. He was field salesman at Bakersfield and more recently has represented Republic in Long Beach, Rosecrans and other Basin fields.

Macrate Wildcat Yet Above Vedder

A. N. Macrate & Son's Haberfelde No. 1, located near the center of sec. 32,29-26 a mile and a half south of Greeley production, is drilling in slightly softer formation at 11,480 ft. after finding a drilling break at 11,080 ft.

With the Stevens zone, first objective of the attempt, proved gray at 8090 ft., the drill now seeks Vedder zone production similar to that in the adjacent field. However in the opinion of competent subsurface men the horizon is not likely to be encountered for another several hundred feet.

Old Coalinga Field Sees Two Projects

Inactive for several months, the old Coalinga field area is seeing a revival with two projects under way. One outfit under the guidance of Z. L. Phelps is already drilling below 1380 ft. in sec. 20,19-15 while C. M. S. Kipling is planning to drill Thompson No. 3 near the south quarter of sec. 14,20-14.

Business and Professional Directory

THE
HANCOCK OIL COMPANY
of
CALIFORNIA

PRODUCERS - REFINERS
MARKETERS

W. T. WOODWARD

PETROLEUM ENGINEER — GEOLOGIST

TAFT, CALIFORNIA
Security Building

Phones:
Office 33 - Res. 295

EARL M. PRICE AND
COMPANY
Established 1927

Blue Prints—Photostat Copies—Drafting
Supplies—New Kern Co. Oil Maps

SPEED ✱ CARE ✱ QUALITY

TELEPHONE 77

1620 G Street, Bakersfield, California

GERARD HENNY, Ph.D.

Consulting Geologist

417 S. Hill St. Los Angeles

VAndike 7053

MAPS

Large maps of Los Angeles Basin oil fields and map showing all California oil fields. Price $15.00 each on paper and $20 each on cloth. Individual state oil and gas maps of Mid-Continent and Rocky Mountain regions. Maps show geological cross sections at base. These maps indicate wells drilling, wells producing and abandoned, with depths.
All maps revised up to date of purchase.
JAMES C. BRANSFORD
1127 Story Bldg.
Los Angeles, Calif.
Phone: TUcker 7530

Read THE
CALIFORNIA OIL WORLD
"The Oil Man's
Journal"
$1.00 a Year

GRAYDON OLIVER

PETROLEUM ENGINEER

215 West 7th Street
Los Angeles, Calif. VAndike 3696

Classified Advertisements

CLASSIFIED ADVERTISING RATES

Small type: 50c per line per insertion. Count six words to a line. Minimum charge $2.00. All classified advertising payable in advance. Four consecutive insertions at price of three, if copy does not change.

24 times .....$ 7.50 per inch
1 time ..... 10.00 per inch

Not responsible for more than one incorrect insertion.

20 Strings Drill In Wilmington Field

Maintaining its position as California's most active field, Wilmington now has 20 strings of tools working in drilling and redrilling operations. In addition, another score of projects are in preliminary stages ranging from surveyed locations to rigging up and it is estimated that sufficient locations remain undrilled to maintain the present development rate for at least another year.

Figures furnished by the Conservation Committee of California Oil Operators show 1056 wells, whose potentials total 735,000 bbbls. a day, are producing an average of 87,000 bbls. a day which is more than twice the amount produced in any other field.

Hathaway Plugs Oak Canyon Well

Topping the Lechler No. 2 zone at 7850 ft. and finding it barren to 8091 ft., Hathaway Co. has plugged Ram No. 2 to 2530 ft. with the intention of redrilling through the shallow sand which was logged at 2650 ft. Because of the low static pressure in the upper zone, it was thought best to drill a new hole into it rather than to plug the old hole and attempt to make a well.

Western Gulf Oil Co.'s Geo. R. Wickham No. 1, sec. 31, 5-17, is coring below 7000 ft. in search of the deep sand after recovering from a fishing job at 6995 ft. Several stringers of oil sand have been encountered making the outlook pretty fair for this one.

Brookner Spuds Montebello Well

Brookner Oil Co. has spudded in its Montebello south flank test at the intersection of Avenida de la Merced and Lincoln Blvd. The well seeks production in the old shallow sands near the 4000 ft. level.

Ten Section Well Makes Good Flow

Evidence that the Ten Section field has lost none of its potency was again demonstrated when Shell Oil Co.'s KCL No. A-75-29 was completed from 8235 ft. flowing 3367 bbls. of clean 33.2 gravity oil on an open potential trial. With no restriction on the lines, tubing pressure was 280 lbs. and casing pressure was 1750 lbs. while 3,750,000 cu. ft. of gas was measured.

New "baby" tractor built for small farms can plow, disk, cultivate, plant, haul or act as a power plant and supplement larger machines on big farms.

Selling service instead of "ideologies" American gasoline filling stations in Brazil are making friends for Uncle Sam, travelers report.

Oil Men's Calendar

Calif. Natural Gasoline Association. Los Angeles Chapter—Meets 1st Thursday Each Month, Barker Bros. Bldg., Los Angeles—Dinner at 6:00 (Optional). Taft Chapter—Meets Third Thursday Each Month.

American Society of Mechanical Engineers—Los Angeles Section—Meets 2nd Thursday Each Month—Barker Bros. Bldg., Los Angeles. Dinner at 6:30 (Optional).

December

3—New Mexico Oil & Gas Assn., Artesia, New Mexico.

A CONTRIBUTION TO

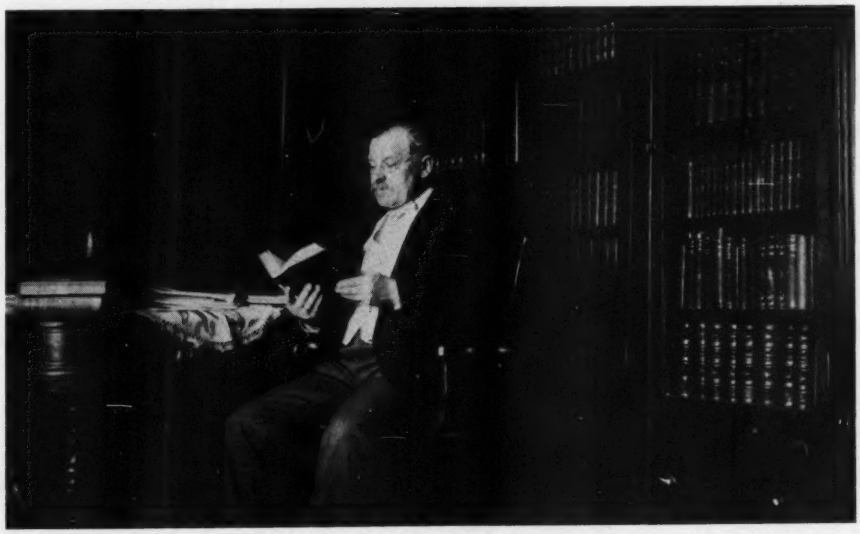
CALIFORNIA OIL AND GAS HISTORY

BY WALTER STALDER

Copyrighted, 1941 by Walter Stalder. Published October, 1941. All rights reserved, no part of this book may be reproduced in any form without permission in writing.

That, through fading memories and obscure records, some early fascinating history of an almost forgotten, but highly interesting California gas and oil exploration may be further saved from possible oblivion, and, that succeeding explorers may profit through the efforts of early pioneers the following pages have been written.

To afford an idea of the relative antiquity of the gas and oil industry of Northern California, a few instances may suffice. At the time of Drake's discovery of oil in Pennsylvania (1859) natural gas from a drilled well in Stockton had been in use for several years. When the Colonel Thomas A. Scott titles, through Judge Levi Parsons, were being procured on prospective oil lands in Humboldt County, Scott was serving as Assistant Secretary of War in Abraham Lincoln's cabinet. When Leland Stanford was interested in actually building the Central Pacific Railroad to California, his older brother, Josiah, was distilling oil from the first productive *drilled* well in California. Immediately prior to the time that Captain Knyphausen Geer superintended drilling for oil on Oil Creek in Humboldt County, he was engaged in fighting Indians out of Fort Humboldt. While the influx of pioneers into California, following the discovery of gold at Sutter's mill in 1848, brought a number of pure adventurers and unscrupulous fortune hunters of no credit to the community, the preponderance of newcomers were men and women of fine basic qualities. They migrated from our northern, our southern and our mid-western states as from the whole



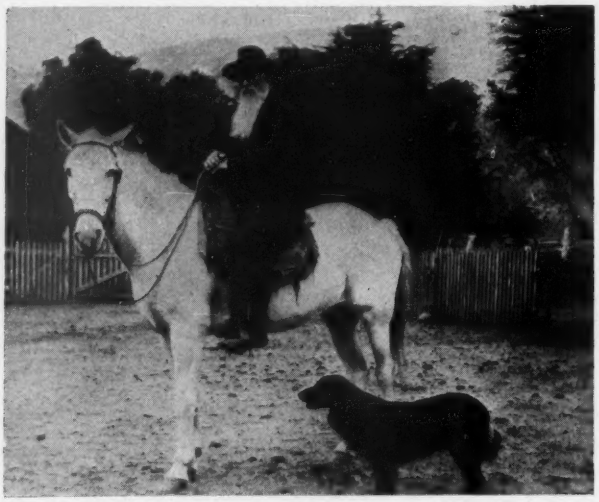
JOSEPH STALDER, 1849-1931, father of the author, who was instrumental in bringing about renewed activity in Humboldt County in 1900, and from whose diaries, oil scrap book, and personal records, various information found its way into the present record.

PORTER O'NEAL 1846-1923, pioneer settler of Point Arena, who first discovered outcropping bituminous sands on his claim, and also at the Port of Point Arena, assisted with early experimental oil distilling work and encouraged every legitimate drilling enterprise in the neighborhood.

world at large, even miners from China. It is but natural that any group that has the courage to honestly undertake and withstand a rough and perilous journey by ox team, across the plains and mountains or by sea to a new, distant and undeveloped land with the wide assortment of incidental hardships, should be strong in physique and character and an ideal foundation stock to build up any state. Though many of these newcomers went to the mines, others became business men or artisans in the new cities and towns, while large numbers went to explore and develop the farming, dairying, horticultural, timbering, fishing and many other possibilities of this diversified state. The spirit of the largest group was one of enterprise, with a willingness and pleasure to explore or assist in exploring any of the new resources. It is through these that California's early petroleum and gas prospects were first exploited. That all types of the populace contributed to the early development of this industry the reader will realize as he peruses the succeeding pages.

During these pioneer days San Francisco was the metropolis of California, situated as it is on an excellent harbor, formed where the waters from the fertile Sacramento and San Joaquin valleys, after passing through Suisun and San Pablo bays, pause to further mingle with ocean brines in the sunken San Francisco Bay valley, before passing through the Golden Gate and out into the Pacific Ocean. These inland rivers and bays and the ocean gave early San Francisco the natural water way transportation facilities that brought practically all of the important commerce of the state through her port. It was indeed a busy city and an early oil industry was shortly centered there.

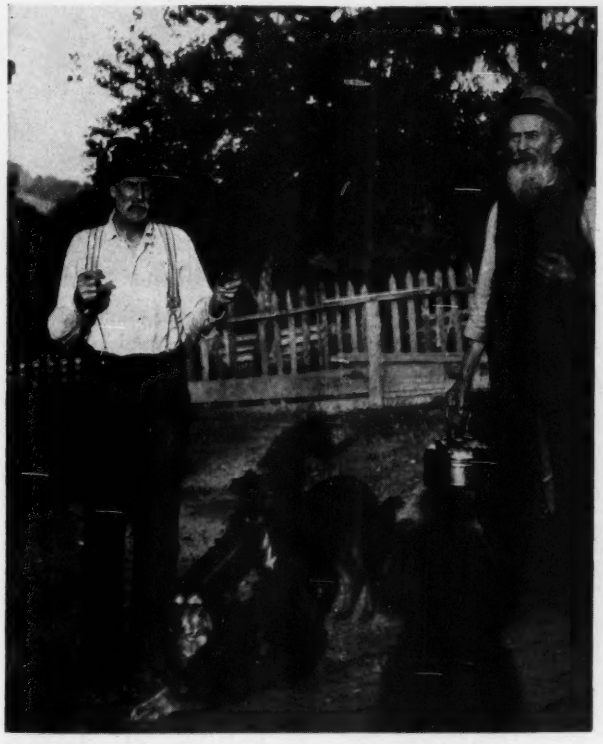
At this period electric lights had not been thought of. Manufactured gas from coal costing $36.00 to $40.00 per ton was used in San Francisco beginning February 11, 1854. It was then sold at $15.00 per thousand cubic feet. (Annals of San Francisco by Frank Soule, John H. Gihon, M. D. and John Nisbet, D. Appleton & Co., New York and San Francisco 1855, p. 378.) Coal oil had been in use in the eastern states for some time, having been manufactured from coal. Although some of this material was imported from the Atlantic Coast, and very often whale oil or sterein candles were the source of light, camphene was the principal illuminant and was burned in lamps. This fluid is obtained by freshly distilling turpentine over lime. Because it rapidly deteriorates through poly-



THE LATE SILAS W. MORRISON (1827-1912), pioneer settler of Bear River, Humboldt County (1852), discovered many of the gas and oil seepages of his neighborhood. His faith in their ultimate successful development was that of a true pioneer. He was born in Ohio, had emigrated overland from Iowa to California in 1850, and in 1851 was one of four white men to first look down on Bear River Valley from the hills. His wife was a pioneer young lady who had crossed the plains from Wisconsin in 1856. This couple were typical hard working pioneers and settlers who helped build up our state, and do their full part toward its early oil exploration. (Photo by Walter Stalder, 1908.) Data through courtesy of George W. Morrison of Ferndale, Calif.

merization by standing for any length of time it is necessary that it be freshly distilled. For this reason camphene distilling plants were early erected in San Francisco. The first of these was one located on Natoma Street and operated by George Dietz & Co. in 1851, and another by Stott & Co., with a plant on Taylor Street near Meiggs wharf. By 1858, six or more such plants were in operation. Among these was one run by Stanford Brothers, under the name of Pacific Oil and Camphene Works, which business they purchased in 1856. (San Francisco City Directory and Min. & Sci. Press Aug. 4, 1860.) From 1851 to 1853 camphene sold for $1.50 to $4.50 per gallon. In 1860 it sold for 80¢. (Min. & Sci. Press August 4, 1860.).

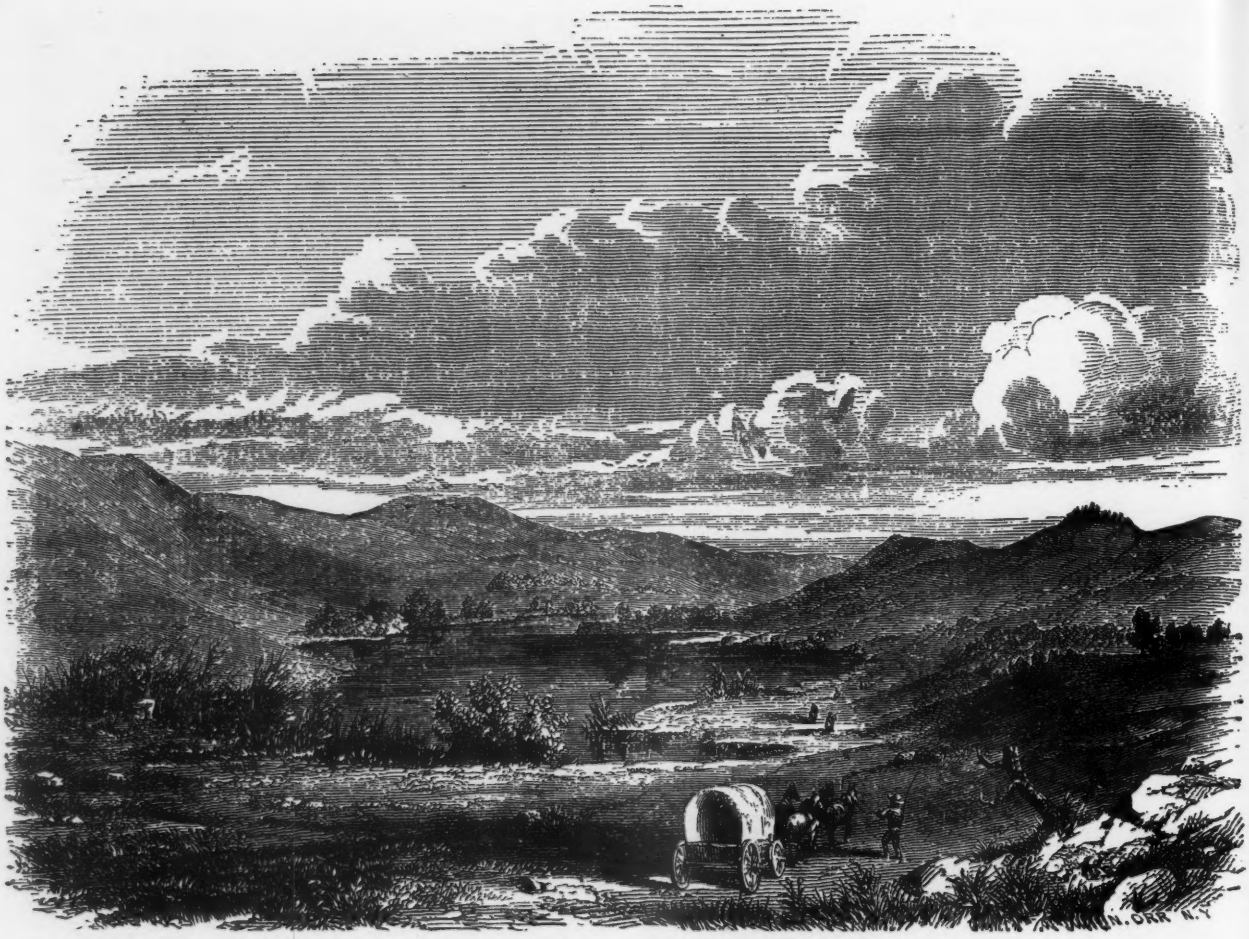
George Dietz had come to California from Burlington, New York, in 1849, and after mining a very short time came to San Francisco and pioneered in the illuminating fluid business. His brother, Alfred Clinch Dietz, at the age of twenty years, soon followed and upon arrival in San Francisco in 1851, had joined the same business which for a number of years was operated by both brothers and later solely by Alfred C., who continued to build it into a very lucrative operation. During the earlier years of this enterprise, political and police conditions in the rapidly growing city of San Francisco had become so lax that it became necessary for the better thinking citizens to take matters in hand.



THE LATE GEORGE EDMONDSTONE (left in photo), was a highly respected Scotch gentleman and stock raiser, on whose ranch the Union Mattole well was located, and who endeavored to keep this historic well intact. (Photo by Walter Stalder, 1906).

CAPTAIN KNYPHAUSEN ("FOSS") GEER 1836-1921, early settler of Bear River, Humboldt County. His grandfather fought in the Revolutionary War under Ethan Allen. When Indian troubles started in Humboldt County in 1863, "Foss" promptly enlisted in Company A, first battalion of mountaineers, California Volunteers, and became a Captain in 1864, at Fort Humboldt. He rendered valuable services, and on being mustered out in April, 1865, was made superintendent of spring-pole oil drilling activities on Oil Creek. He was a strong, fearless, upright, honest pioneer, with undying faith in the oil possibilities of Humboldt County, and represented a fine type of true American citizenship. Data through courtesy of George W. Morrison of Ferndale and Mrs. Elron Edgerly of Napa, Calif.

When the famous Vigilance Committee was active, A. C. Dietz was soon numbered among its members. (Note: Much of this data is taken from a History of the State of California and Biographical Records of Oakland Environs by J. M. Guinn, Historical Records Co., Los Angeles 1907. Vol. II p. 573. In this biogra-



LAKE ELIZABETH, SAN FRANCISQUITO PASS.

LAKE ELIZABETH is beside the old original wagon road over San Francisquito Pass to Los Angeles from the San Joaquin Valley. In 1853, Williamson found a more open pass farther to the east, and these, along with the Boquet Canyon pass, served as the chief arteries for road travel until the Ridge Road was built in 1915 to serve as a short cut from Antelope Valley to Castaic.

phy of A. C. Dietz, Guinn refers to A. C. Dietz's brother as Theodore, while the company advertisement in the San Francisco City Directory of 1858 gives his name as George. The writer has used the name George because he believes the firm's early advertisement as more authentic than that of a later literary man.).

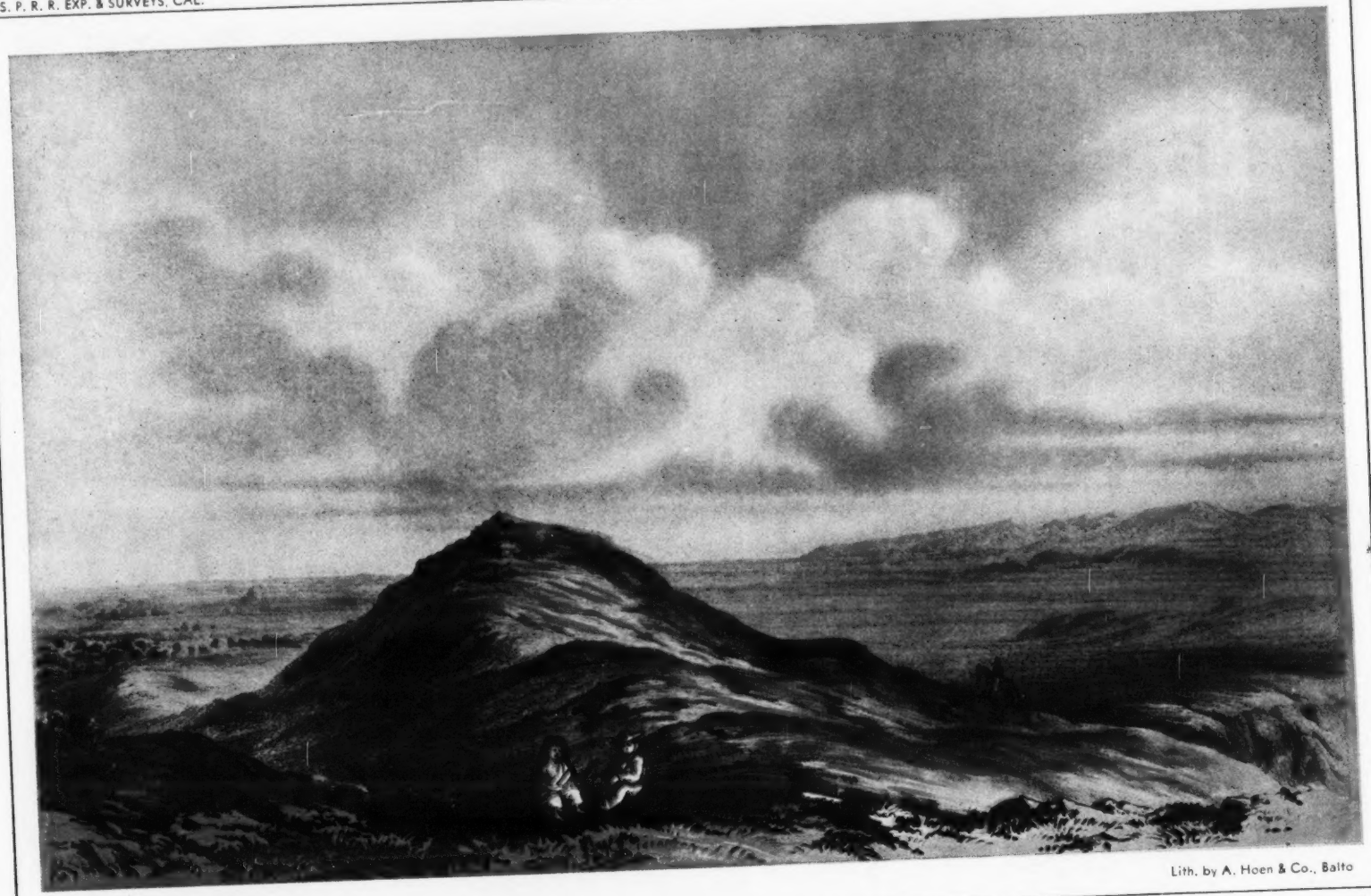
Of Stott & Co. no channels have been found and sufficiently explored as yet to reveal their antecedents. The firm was progressive and remained in the business for several years. Charles and Alexander Stott formed the company with the former at the plant and Alexander in the office. They were the contemporary pioneers of the California illuminating fluid business with the Dietz brothers in San Francisco, and soon followed along with the early California oil industry.

Identified with the Stanford Brothers' plant were Josiah, A. P. and Charles Stanford. (San Francisco City Directory 1866, p. 412.) Another brother, Leland, may possibly have had some silent connection with the company since all of the young men had been closely associated since boyhood, but Josiah was the moving spirit in the oil and camphene business which they entered in 1856. These brothers had been brought up on a farm in New York state. As there had not been a sufficient family income to follow through with a finished education for all, Leland had been the only one favored with advanced training, through which he prepared for the legal profession. Josiah, the oldest brother, had been a leader among the boys, and in 1849 came to California to investigate business prospects for the family. He was soon joined by his brothers, Charles and De Witt. His report on the future possibilities was excellent and other brothers, Thomas Welton, Philip and Leland, followed in 1852. They entered the mercantile business, establishing headquarters in Sacramento. Leland Stanford took over this business

→

LOOKING WEST from the foothills of the Sierra Nevada over the San Joaquin Valley. Kettleman Hills in the left distance.

UNIV. OF MICH.



From a sketch by Chs. Koppel.

Lith. by A. Hoen & Co., Balto

PLAIN BETWEEN KAH-WEE-YA AND KINGS RIVERS.

THE SUTTER BUTTES. The high hills in the background represent the volcanic core, and the gentler slopes and lower hills the sedimentary ring, which surrounds this core. The gas and oil problem was believed to be, and later found to be, quite similar to accumulations about the volcanic plugs of Mexico, and the salt plugs of the Gulf Coastal plain of Texas and Louisiana. In February, 1933, The Buttes Oilfields, Inc., brought in the first controlled high pressure gas well in Northern California onthe south flank of the structure. (Photo by Walter Stalder, 1937.)

when his other brothers went to San Francisco in 1856. (Leland Stanford, by Geo. T. Clark, Director Emeritus Stanford Library 1931, Stanford University Press, Chapter III, p. 47 and p. 64.). This family is so well known through Leland Stanford's connection with promoting and building the Central Pacific Railroad, serving as Governor of California and as United States Senator, and later endowing Leland Stanford, Jr. University, that the connection of other members with the early illuminating oil industry of California has been generally overlooked. Shortly after they entered the camphene and oil business, A. P. Stanford went to Australia and Charles to New York, leaving Josiah to run the plant and business in San Francisco.

Earliest Activities in Gas and Oil

The Court House well at Stockton, bored to an ultimate depth of 1003 feet between 1854 and 1858, produced gas and water. This gas was put to use at the Court House and is still in economic use there. (Weber, A. H., Calif. State Min. Bur. State Mineralogists Report 7:180-186—1888.).

As early as 1856 Andreas Pico had distilled oil for use in illuminating the San Fernando mission. This crude oil he obtained from tar seepages in Northern Los Angeles County. In 1857 Charles Morrill, a druggist with stores in San Francisco and Sacramento, had a small distilling plant erected at the maltha seepages near what is now Carpinteria in Santa Barbara County, and produced illuminants, but without commercial success. (Hanks, H. H., Calif. Mineralogists Report 1884, pp. 293-294.).

Almost immediately after the completion of the Drake discovery well in Pennsylvania in 1859, a live interest was stimulated in California crude oil for the production of kerosene or coal oil, as it was then commonly called. Many oil and asphaltum seepages were known through the state and in certain parts of Northern California small seepages of paraffin oil were also known or very shortly found by investigating pioneers. Some of these prospectors developed great skill in detecting the various surface indications of gas and of paraffin oil and in opening up such seepages. With camphene stills working in San Francisco what liquid oil was produced mostly found its way there to be refined.

With the pioneering instincts of the early California population and an increasing knowledge of various light oil and asphalt oil residues and seepages, it was natural that all recognized potential areas should be early exploited. This increasing interest ripened into an oil boom in 1865. In the north the crude light oil seepage areas of Humboldt, Colusa, Santa Clara and San Mateo counties and the asphalt seepages and bituminous residue areas of Mendocino, Marin, Contra Costa and Santa Cruz counties, had already received some attention, but in 1856 this reached its maximum. In the south the large bituminous seepages in Ventura (formerly a portion of Santa Barbara), Santa Barbara, Kern (formerly Tulare) and Los Angeles counties received most attention. At this time the industry was in its infancy and very little was known of the laws governing the accumulation of gas and oil. Consequently, the tendency was to carry on all operations near seepages or near oil sand outcrops. Trenches, pits, tunnels, shafts and shallow wells, drilled either with spring poles or with horsepower or with light steam driven engines, were the instruments of production. In this exploration it was natural that the camphene distillers of San Francisco should also take an early part.

The Colonel Scott Interests

From the standpoint of early recognizing the future possibilities of a California petroleum industry, Colonel Thomas A. Scott probably had the broadest vision at

BLUFF OF SANDSTONE, WILLIAMSON'S PASS.

WILLIAMSON'S PASS. See account of New Pass.

that time. He was vice-president of the Pennsylvania Railroad. During the war between the states (1861-66) he was inducted by President Abraham Lincoln into a new office of Assistant Secretary of War to handle railroad matters during that struggle. Scott had always had a keen interest in the development of Pacific Coast resources and planned to build the Texas and Pacific Railroad from Marshall, Texas to San Diego, California. He had profited handsomely from an early oil venture in Pennsylvania. It happened that in 1859 the Pennsylvania Railroad had an enterprising young telegraph operator by the name of Andrew Carnegie working for the company. During the first oil excitement he induced J. E. Thomson, president, and Thomas A. Scott, to purchase with him the Storey farm on Oil Creek, Pennsylvania. Their investment was $40,000.00, while one year's return from it was more than $1,000,000.00 and the stock of the company attained a value of $5,000,000.00. (National Cyclopedia of American Biography 9:151-153 1899.) It was, therefore, most logical that in connection with plans for the railroad to California, he should look to that state's latent oil possibilities. In 1863-4 he sent an expedition to Arizona to buy prospective gold lands (The Road 2:281-282 Thos. S. Fernon Philadelphia Publishers.) and in 1864 Professor Benjamin Silliman, Jr., of Yale University, came to California and reported on extensive prospective oil lands. Following this report, Scott acquired by purchase the following ranchos; Simi (113,000 acres), Los Posas (26,500 acres), San Francisco (48,000 acres), Calleguas (10,000 acres), Colonia (45,000 acres), Canada Larga (6,600 acres), Ojai (16,000 acres), a large part of the town of San Buenaventura, all in what is now Ventura County, but was then Santa Barbara County, and holdings in Humboldt and Los Angeles counties, comprising in all a grand total of some 277,000 acres. (Gidney, C. M. and Brooks, Benjamin and Sherman, History of Santa Barbara, San Luis Obispo and Ventura counties, Lewis Publishing Co., Chicago, Ill. 1917 Vol. 1, pp. 358-9.) The extensive tar seeps and bituminous sands about the southern ranchos made them very attractive as prospective oil lands. The Scott holdings in Humboldt County, because of being situated in Northern California, are of direct interest in the present narrative.

For the purpose of developing the California lands purchased by Scott, there were eventually formed: The Philadelphia and California Petroleum Co.; the Cali-

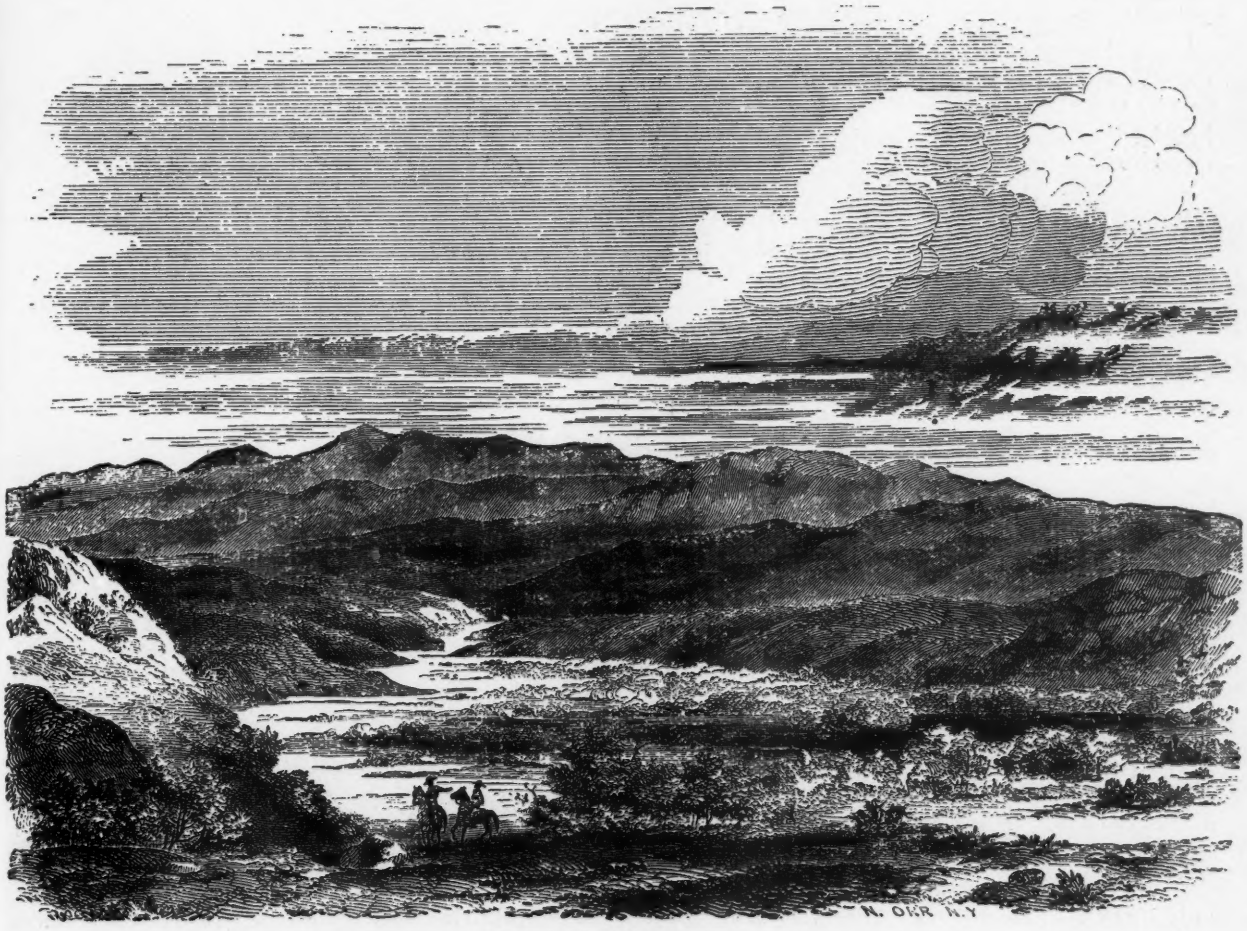
fornia Petroleum Co. and the Pacific Coast Petroleum Co. The president of the California Petroleum Co. was John P. Green, who was for a number of years private secretary to Colonel Scott. To take care of his California holdings, Scott sent Thomas R. Bard to California, where he arrived in January 1865. Thomas Bard was then a young man of 24 years who had started to study law at 17, had later joined an engineering corps, and in 1860 had become a bookkeeper in Hagerstown, Maryland. For a young man, the opportunities offered in his new position were wide and promising. He shortly became superintendent of the California Petroleum Company and a moving spirit in political affairs and, later, in the development of Ventura County. He also later served as United States Senator.

Humboldt County Gas and Oil Indications

The early prospective gas and oil regions of Humboldt County are located in its southwestern portion, in the territory drained by Oil Creek, Upper Price Creek, Bear River, Singley Creek, Davis Creek and the Mattole River, with Cape Mendocino, the most westerly point in Continental United States, excepting Alaska, standing out almost in the western center of the area. This district lies to the west of the beautiful redwood belt, although some gas and oil indications have later been found among such forests. Because of its rugged coast with no real landing places for ships, poor roads and few trails, this picturesque terrane with its grassy slopes, intermittent pine and fir forests and frequently rugged ranges, has always been isolated from the general line of travel. Early maps left the area blank because it had not been explored. At many places along the coast and in gulches up the valleys, a distinct kerosene-like odor frequently permeates the atmosphere, in places sandstone beds outcropping in such areas are grease stained and, when dug into, give rise to seepages of paraffin oil. On November 8, 1861 the following appeared in the Mining and Scientific Press:

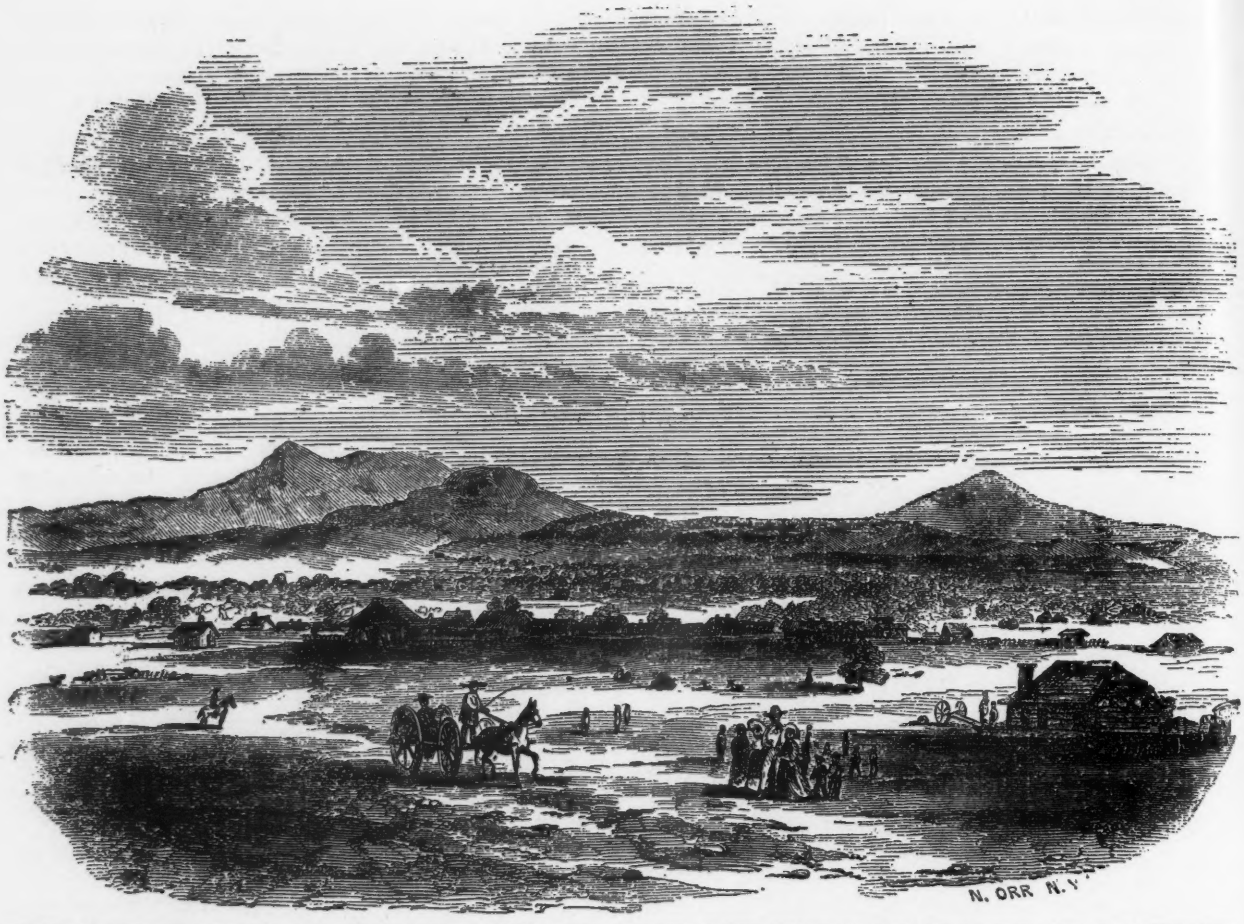
"Humboldt County

"Coal Oil



ENTRANCE OF NEW PASS.

NEW PASS, LATER CALLED WILLIAMSON PASS, a crossing of the mountains out of the Mojave Desert, discovered by Williamson in 1853. It is approximately equivalent to the present Mint Canyon and Soledad Canyon route of the S. P. Ry. from Mojave to Saugus.



MORMON SETTLEMENT IN THE SAN BERNARDINO VALLEY, WITH A VIEW OF THE PEAKS OF SAN BERNARDINO AND SAN GORGONIO.

ON NOVEMBER 8, 1853, Lieutenant J. G. Parke, with a wagon-train, crossed the Cajon Pass (where the Santa Fe Ry. now crosses the moutains from San Bernardino to Barstow in the Mojave Desert), and reached the Mormon settlement of San Bernardino, a "flourishing little village."

"We learn that the miners for natural coal oil are very sanguine that they have their fortune in store, in Lower Mattole Valley. Major McCoy has a natural spring out of which he has dipped as many as 30 gallons in one week. Prospects on Mr. Davis' ranch, where a well is being sunk on the principle of artesian wells, are very flattering.

"There are also some other curious facts connected with this region of country which deserve notice. Near the Mattole River are a number of escapes, out of which is constantly issuing gas which has the peculiar smell of the manufactured article which lights all our principal towns and cities, and, when a blaze is applied, it readily ignites, and will blaze up many feet in the air. One of these escapes is in the Mattole river near the center, and with a torch, any person who has the curiosity to try it, may do what few people have thought possible—set the river on fire. There are a number of them on Bear River some 15 miles north of Mattole and above Cape Mendocino." (Note: This well of 1861 is the first California well drilled for oil of which the writer has found record. Mr. John B. Davis had an original homestead claim near the mouth of Davis Creek.)

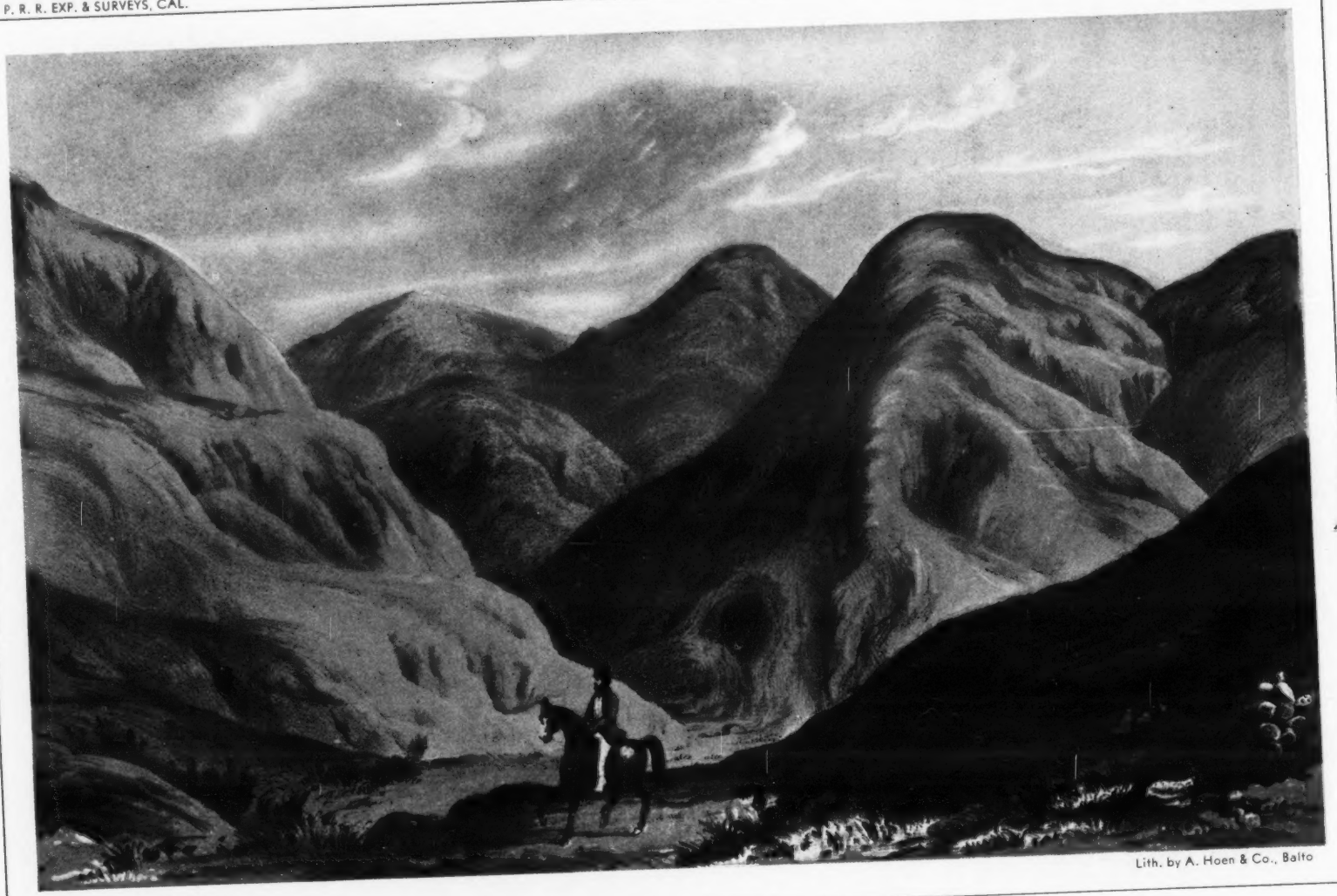
Early Humboldt County Oil Promotion, Personnel and Excitement

In 1864 Mr. J. W. Henderson, who afterward became a leading banker of Eureka, California, was on a business trip to Humboldt County, and hearing of the oil indications in the Mattole Valley, secured four sample flasks of the fluid, and on horseback started his return trip to San Francisco. At Covelo in Mendocino County he left his horse for a few minutes, and when he returned, the horse had taken a roll and broken three of the bottles. With the remaining sample he reached

→

WHAT THE WELL-DRESSED GEOLOGIST wore in 1853. Ocoya Creek and Posuncula River are the old names of what are now called Poso Creek and Kern River. Kern was a geographer and surveyor in Fremont's second exploration party. He fell in the river and so Fremont named it after him.

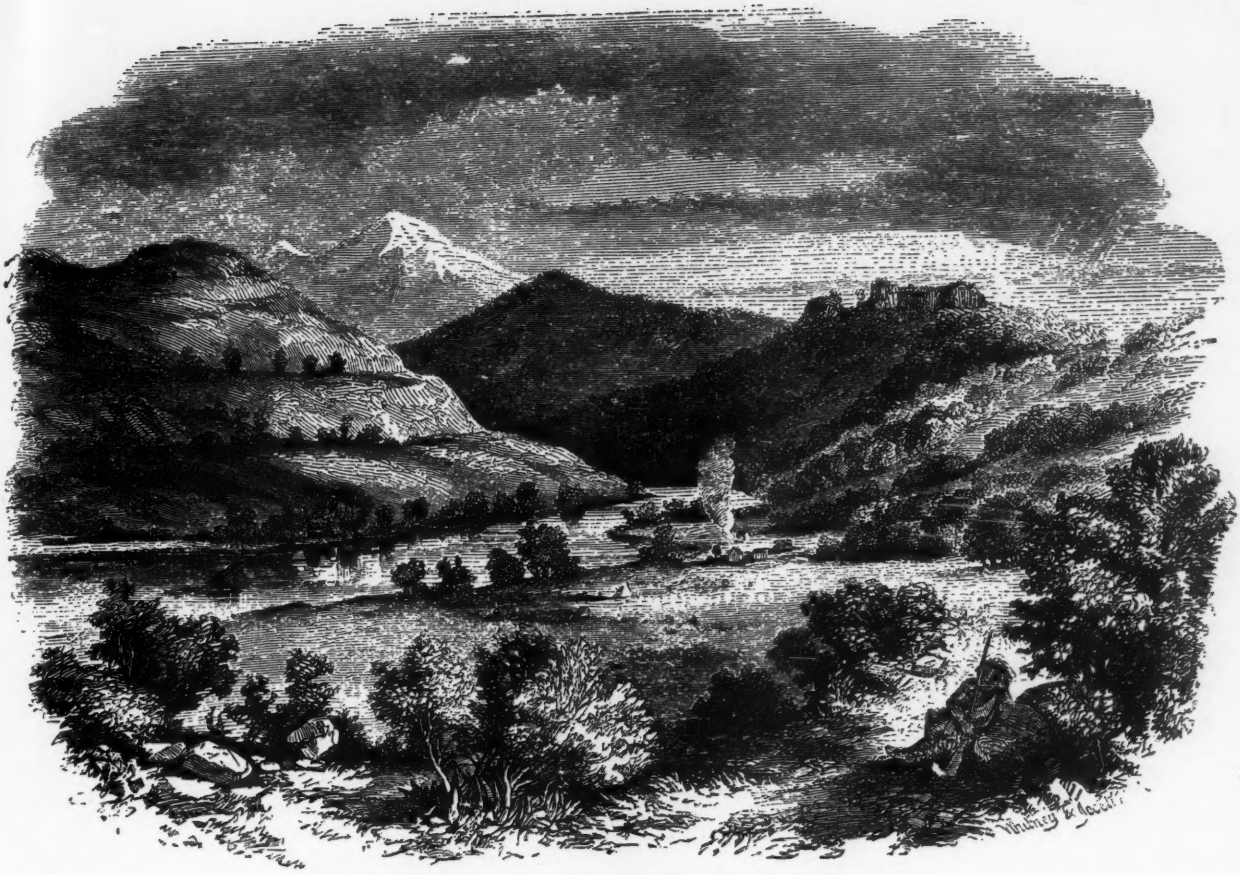
UNIV. OF MICH.



Lith. by A. Hoen & Co., Balto

From a sketch by Chs. Koppel.

ROUNDED HILLS, TERTIARY.
(Between Ocoya Creek and Posuncula River)

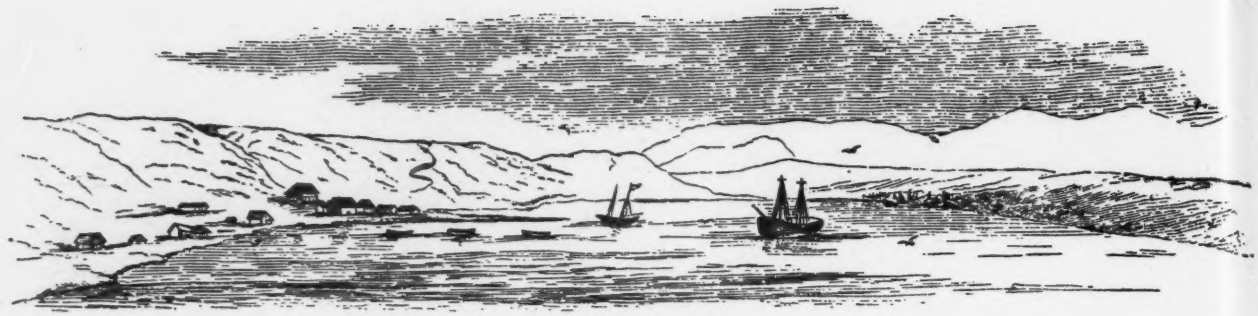


VALLEY OF THE SAN JOAQUIN AT FORT MILLER.

FORT MILLER, a military post on the San Joaquin River in the foothills of the Sierra Nevada. "The water in the river was remarkably pure and clear, and very cold; its temperature seldom rising above 64° Fahrenheit, while that of the air varied from 99° to 104° in the shade. A difference of 40 degrees in the temperature of the air and the water is not uncommon, and it becomes very evident when bathing in the stream during the day. The Indians who live on the banks of the river do not, however, seem to regard this difference of temperature as sufficient, for it is their custom to prepare themselves for their bath by a preliminary baking in large underground huts, which have only one aperature, fronting the stream. A fire being built in the center of the apartment, the Indians crowd around it, and frequently add to the humidity of the atmosphere by pouring water on heated stones. After a violent perspiration is thus produced, they rush into the river with much gratification."

San Francisco, and, in connection with Judge Levi Parsons, the Col. Thomas A. Scott group were approached and became interested. Mr. Henderson returned to Humboldt County as manager, and through Judge Parsons, the Scott interests purchased nearly 15,000 acres of land with Indian Scrip and School Warrants. (The price of scrip was $2.50 per acre but by careful buying it could be secured at a fraction of that figure.) The surface rights to these lands were then sold and the mineral rights retained. (Humboldt Weekly Standard Jan. 2, 1901.)

Judge Levi Parsons was an aggressive pioneer of a type that has so frequently been found in various railroad, mining, and oil ventures, that one or two incidents may serve to characterize him. He was a district judge serving in early San Francisco during the time that the criminal element was getting out of hand and the public was beginning to criticize the courts. One San Francisco paper published an editorial that so scathingly denounced the ability of the San Francisco judicature that Judge Parsons had Mr. William Walker, one of its editors, arrested and brought into his court where he himself served as plaintiff, judge and jury. He convicted Mr. Walker of contempt of court and fined him five hundred dollars, ordering him kept in custody until the fine was paid. Mr. Walker went to jail. He was finally released on a writ of habeas corpus and the case appealed to the Superior Court where Mr. Walker was discharged. This case caused great public indignation and the legislature was petitioned to impeach Judge Parsons. A select committee of the State Legislature later failed to find sufficient grounds for such impeachment, but Judge Parsons was not returned to office. (The Annals of San Francisco, D. Appleton Publisher, San Francisco 1865, pp. 322-324.) Again, in 1860, Judge Parsons went



SAN DIEGO FROM THE BAY.

JULY 4, 1853, entering the harbor of San Diego. The hills were rounded and entirely devoid of any trees.

to Sacramento and lobbied through a bill that would have granted to the San Francisco Dock and Wharf Company of which he was the head, the right to build a bulkhead in San Francisco Bay over which practically all of the commerce of the port would pass. On this they were to be permitted to collect tolls. Although the bill passed both houses of the legislature, the public opposed the bill and Governor Downey vetoed it. (Bench and Bar in California by Oscar T. Shuck, Occidental Ptg. Co., San Francisco 1889, pp. 35c and 35d.) Judge Parsons subsequently went east and is credited with building the Missouri, Kansas and Texas Railroad. He retired in 1866. He later gave $50,000 to Union College for the purpose of assisting certain students to a college training. Union College gave him an LL.B. degree in 1881. (Appleton's Cyclopedia of American Biography, D. Appleton & Co., New York 1882, Vol. IV, pp. 663-664.)

Because of the close resemblance of Humboldt County crude oil to that produced in Pennsylvania, and the steadily increasing interest in exploiting this latent resource, other lands than those secured by the Thomas A. Scott interests were filed on by various parties and soon were in shape for development. Through the shipment to San Francisco of crude paraffin oil from some shallow spring-hole drilled wells of Humboldt County, the 1865 oil interest became one of excitement that ripened into California's first oil boom. Among these wells was that of the Union Mattole Oil Company, the Scott and Parsons well on Joel Flat, and the Allen and Sutter wells in McNutt Gulch, all of which were shallow. Petrolia was the name that had been given to the prospective oil town at the junction of the Mattole River and its north fork.

The Union Mattole Oil Company had filed its articles of incorporation with the Secretary of State in Sacramento March 25, 1865. (Records of Secretary of State, Sacramento, Calif.) Its directors were all business men of San Francisco. One, Thomas Richards, was in the real estate business, another, William Ede, was a contractor and the third, Edward Bosqui leading printer and book binder. Their first well was located at an isolated site up the beautiful North Fork of the Mattole River in Section 30, T. 1 S., R 1 W., H. B. & M.

The Allen and Sutter group were from Napa, and Col. Wm. Muldrow was field superintendent. Their wells were located in McNutt Gulch, Sections 29 and 30, T. 1 S., R. 2 W., H. M.

The Scott and Parsons well was drilled under the management of J. W. Henderson with Mr. Noble as superintendent. This well was sometimes known as the "Noble" well.

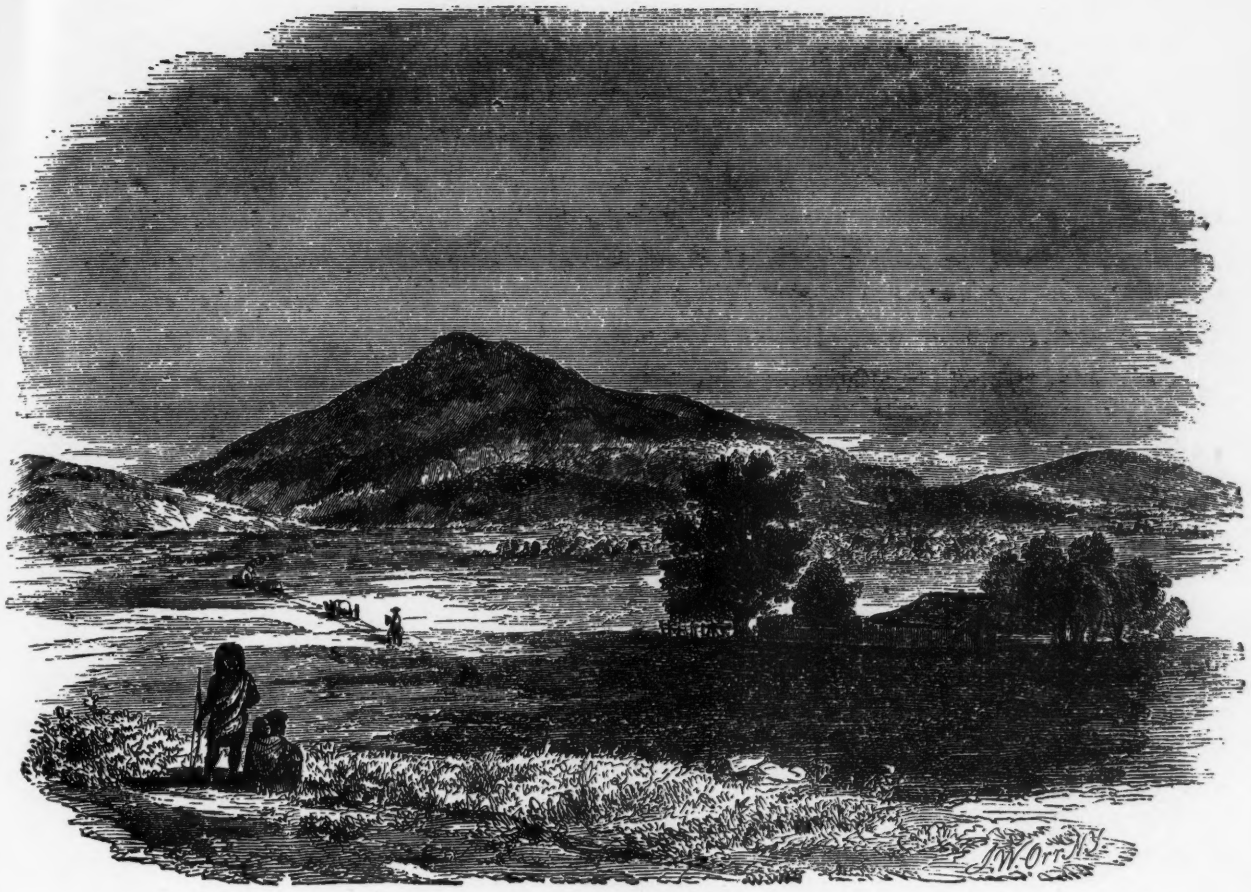
Evidently the operators at the Union Mattole well were fast workers and quickly reached the oil, for in a news item under date of June 10, 1865, the Humboldt Times stated:

"The First Shipment of Coal Oil from Humboldt County—On Wednesday last Mr. F. Francis of Ferndale brought into town six packages of from 15 to 20 gallons each of coal oil taken from the well of the Union Mattole Oil Company. This will go to San Francisco by the present trip of the steamer and is the first shipment of crude oil from the oil regions of this county.

"Although not a large quantity, it will have a tendency to dissipate some of the doubts entertained by the San Franciscans as to the existence of that article in this locality, and compel them to pass to the credit of this county some little of what is her honest due. We congratulate this company on their good fortune in being in the advance of all other competitors in finding the first oil."

This shipment of between 90 and 120 gallons reached San Francisco June 12, 1865. The Mining and Scientific Press of June 24, 1865, stated that this oil was in the process of being refined by Mr. Benoist on Third Street, and that sixty gallons of refined burning oil from the crude had already been delivered to the company's office on Merchant Street, and that the quantity of lubricating oil contained had not then been determined.

In its issue of August 26, 1865, the Humboldt Times mentioned that the Union Mattole Oil Company and other companies, among which were "Allen and Sutter" and "Noble", had shipped on Thursday, via steamer **Del**



SAN GORGONIO MOUNTAIN.

SAN GORGONIO PASS, between Mts. San Gorgonio and San Bernardino. The building in this sketch is the Weaver house, near the summit of the pass. This is the present S. P. Railroad route from Redlands east, the high point between Redlands and Palm Springs.

Norte, an aggregate of about 850 gallons of crude oil to San Francisco from the oil districts of Humboldt County.

The San Francisco Bulletin of September 5, 1865, in its "Merchandise and Market Report", states: "Coal oil. The Union Mattole Oil Company have sold their first shipment of oil (Refined by the California Petroleum Rectifying Company), about 400 gallons, at $1.40 per gallon, cash. We are informed that the first native California petroleum refined was by Messrs. Stanford Brothers which was sold at $1.40." (Note: Mr. Benoist had a chemical laboratory, and not a refinery, on Third Street, and to refine the early shipment of June 12th above referred to, evidently called on Stanford Brothers, who ran it through their still for him. The first shipment was the smaller amount of 90 to 120 gallons and not the 400 gallons that went to the Petroleum Rectifying Company. This interpretation is strengthened by a subsequent advertisement of Stanford Brothers.)

"Having refined the first petroleum from the Union Mattole Company's well and purchased the same from them, thereby fully testing our works, we are now prepared to refine at the lowest rates, any quantity of oil that may be offered, and satisfaction guaranteed.

"The highest price paid for crude oil.

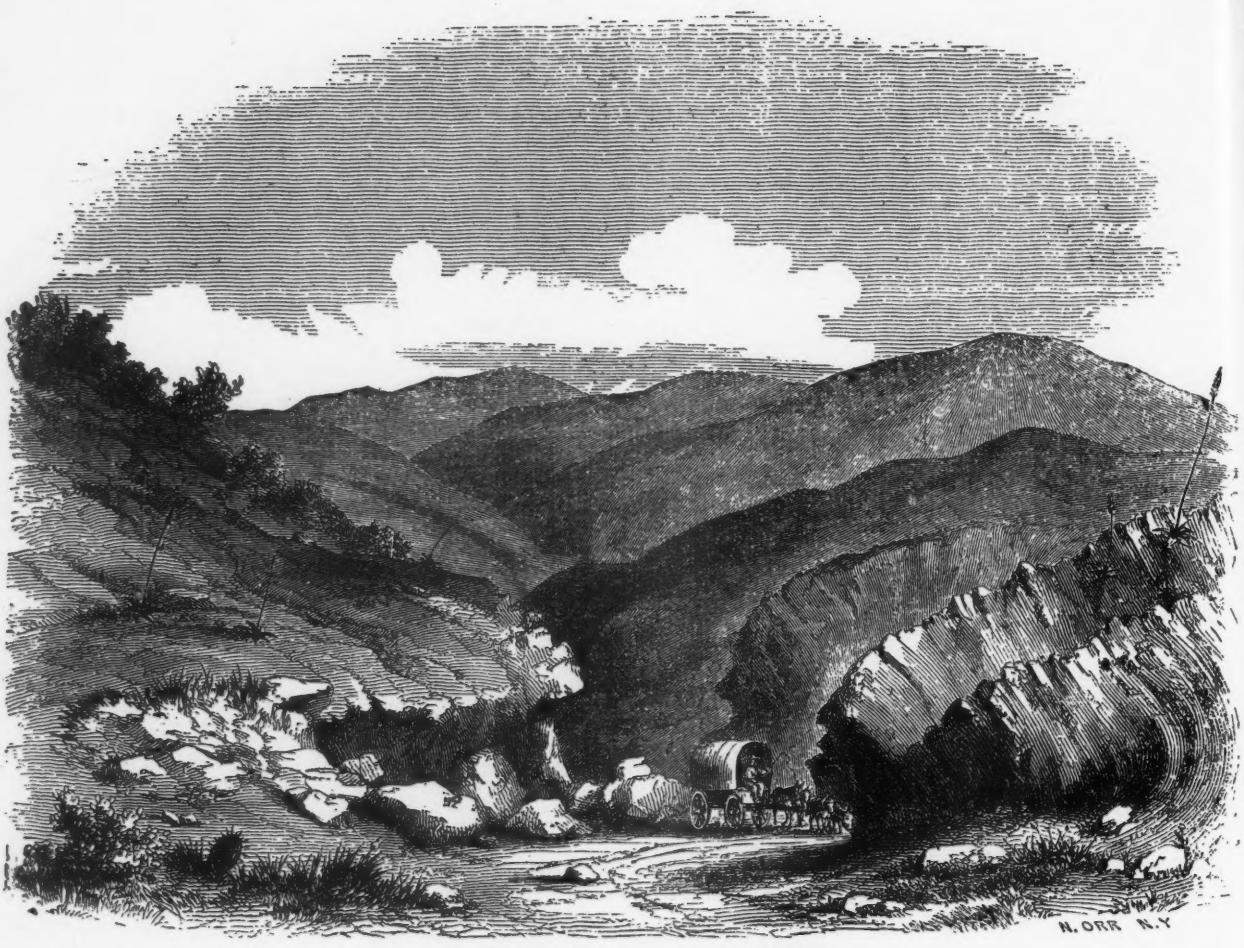
"Parties having oil to refine please make application at our office." (Advertisement in S. F. Bulletin September 26, 1865.)

The desirability of this Humboldt County crude oil, particularly at the time when the chief use of its products was for burning in lamps, is indicated in the following analysis by Professor Rowlanson of Napa:

"Good burning oil .....77 per cent
Amber colored light machine oil.. 5 per cent
Dark colored machine oil..... 4 per cent
Loss and residue .....14 per cent
100 per cent

"The burning oil was of a character equal to the best imported, long lasting and of equal photometric power." (Humboldt Times September 9, 1865.)

As far as the records have been searched, oil from the Union Mattole well appears to be the first from a **drilled** well in California to be refined and sold on the market, and Stanford Brothers are credited with re-



PASS BETWEEN SAN FELIPE AND VALLECITO.

THIS PASS on the Butterfield Stage Route, is on the north side of the Coast Range, about 5 miles from Warner's Hot Springs.

fining it through Mr. Benoist, a chemist of San Francisco.

Under date of September 9, 1865 the Humboldt Times mentions 40 packages of oil at Centerville awaiting transportation to Eureka. This, they believed, was for the most part from the Union Mattole Company well.

The Pacific Mining Journal of September 11, 1865, had the following: "The Stanford Brothers purchased fifteen barrels crude received by the Union Mattole on the **Del Norte,** at one dollar per gallon. Messrs. Hayward and Coleman, oil dealers on Front Street, and E. Mills, Esq., formerly of Sacramento, have commenced the erection of a refinery at South Beach. This company are prepared to make advances on crude oil at the wells, and also to furnish barrels; they will also make advances on consignment for export. The public may rest assured that it was not until after critical examination, and reliable information of the existence of oil in quantity, that this and other companies were induced to erect Refineries for the cleansing and separating of Petroleum. Coal oils are steadily advancing in price, large parcels commanding $1.60 per gallon. * * * No more Petroleum can be shipped from Eureka by the steamer **Del Norte.** The owners risk their policies of insurance and safety of the vessel by the careless use of fire on board the ship, hence their refusal to continue carrying it. Hereafter it must be shipped by schooner. * * * We remember having called several times during the past year on wholesale dealers in oils, with samples of California crude oils, but none of them would credit our statement regarding its existence, and even accused us of unfair motives. These same parties are now the most excited and the leading operators in oil lands and refineries. Stanford & Co., by last advices from their well at San Buenaventura, are advised of two hundred barrels being at the Embarcadero, awaiting the arrival of a schooner for shipment." (Note: This shipment from San Buenaventura, which is not in Northern California, had an importance to the San Francisco refineries that they did not immediately realize.)

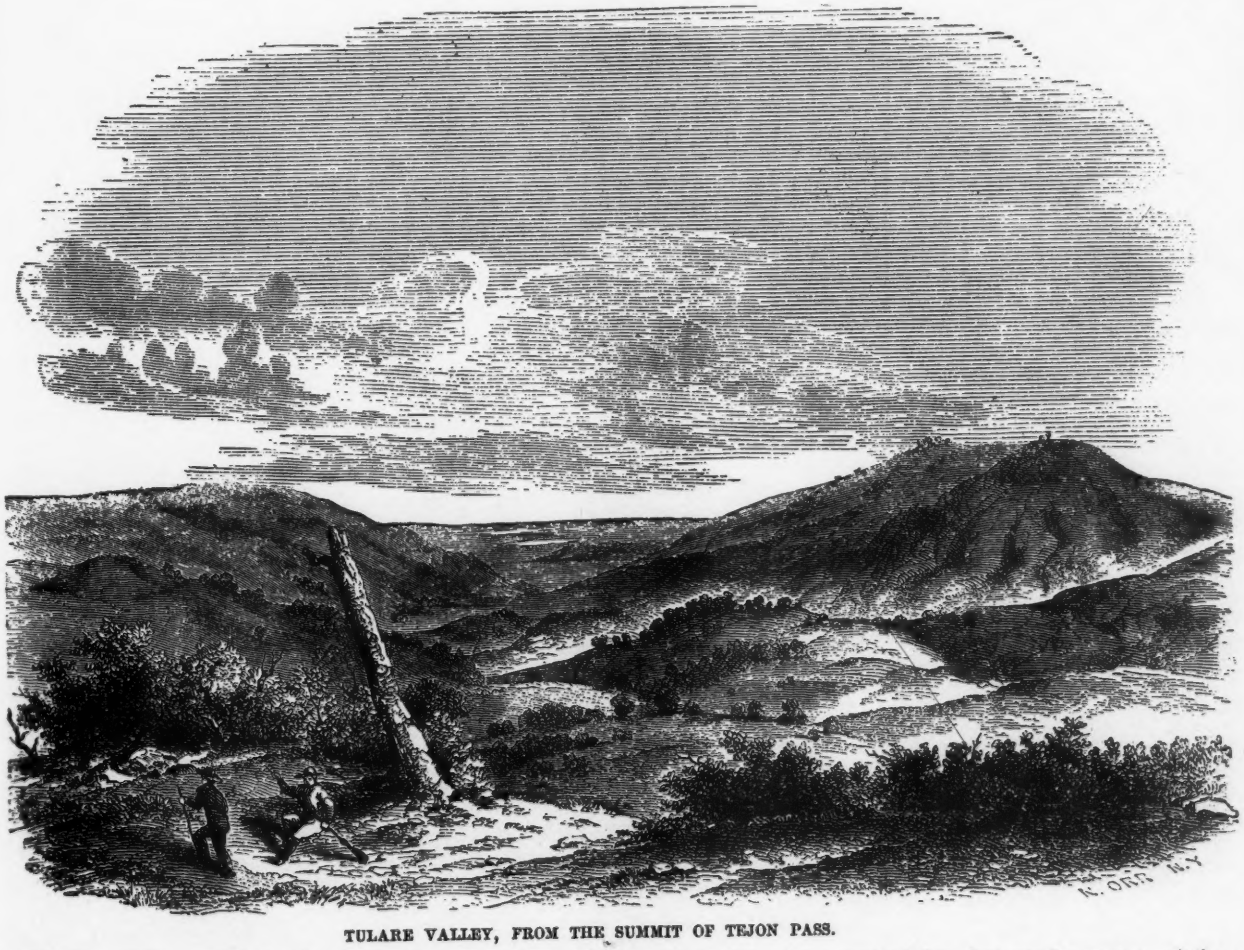
The Mining and Scientific Press, October 21, 1865, stated: "At last accounts Union had forty barrels of

oil at Eureka awaiting shipment by sailing vessels, as the **Del Norte** refused to receive it." On December 2, 1865, the same journal stated: "The Times learns that the Union Mattole Company has about 100 barrels of oil on hand at Centerville and at the well."

Stanford Brothers Acquire Control of Union Mattole Oil Company

That the shipments of oil from the Union Mattole shallow well were impressive to Stanford Brothers is indicated by the fact that they promptly went into the market for control of the oil company's stock. This they gradually acquired, and one year later (Mining and Scientific Press, Saturday, August 25, 1866), an assessment notice appeared and was signed by John W. Allyne, Secretary, and the office of the Union Mattole Oil Company was given as 123 California Street, San Francisco. John W. Allyne was a nephew of the Stanford Brothers and at that time worked for them at the above California Street address. This indicates that they then controlled the Union Mattole Oil Company.

The lands of the Union Mattole Oil Company were not described by section and range, however, in any record in the Recorder's office in Eureka. They were referred to in a deed of March 27, 1865, from the original owners to the Union Mattole Oil Company, as having been located on November 7, 1864 in Book A, Page 7 of the District Mining Records. The records of this district cannot be found in the Recorder's office and there is doubt that they were ever transferred from the Mining District office to the County Recorder's office. Those signing the deed to the oil company were Thomas G. Richards, B. C. Wattles, James Mooney, A. A. Hadley, B. H. Smith and D. H. Henderson. Those transactions were made before any of the lands were applied for at the United States Land Office. Without complete official records these original titles were faulty. In 1866 proper applications were made by Josiah Stanford and John Lyman Beard through their own entrymen, who filed for them on the lands on which the drilling had started, and oil had been developed by the Union Mattole Oil Company, and that Stanford Brothers shortly controlled. (Data from Belcher Abstract and Title Company, Eureka,



TULARE VALLEY, FROM THE SUMMIT OF TEJON PASS.

NORTH FROM TEJON PASS, looking into the Tulare Valley, the name then carried by the south portion of the San Joaquin Valley.

Calif.) Through the discovery in the Union Mattole Well No. 1, these lands could go to patent.

In a letter in the possession of the Misses Edith and Lucy Allyne of San Francisco, the lands filed on by Stanford and Beard were NE¼ of NW¼ Sec. 22, T. 1 N., R. 1 W. and SW¼ of SE¼, S½ of NE¼, S½ of SW¼ Sec. 30, N½ of NW¼ Sec. 31, T. 1 S., R. 1 W., H. B. & M. This land was later transferred to John W. Allyne, and through the Allyne estate to his daughters.

Referring to titles to Humboldt County oil lands the Mining and Scientific Press under date of August 16, 1866, had the following:

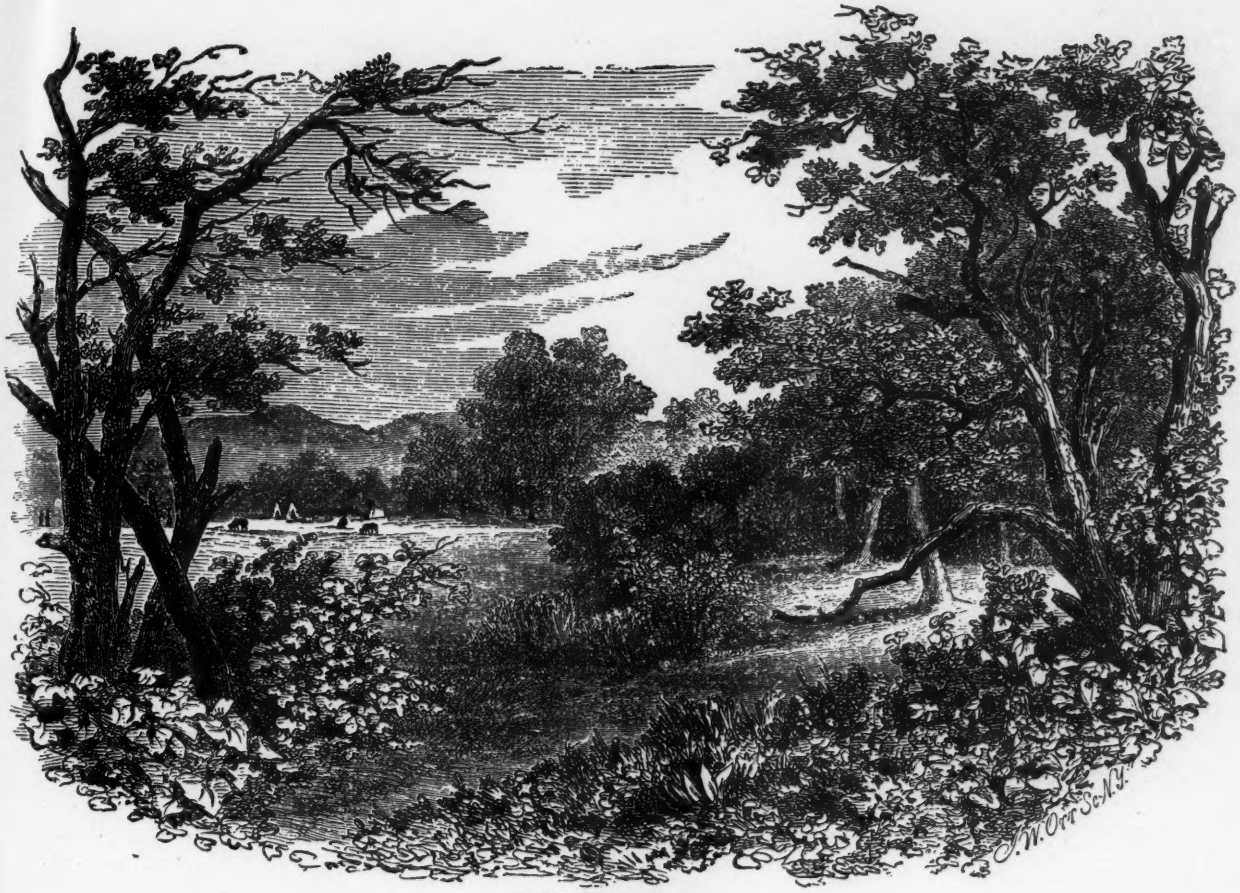
"The land in this vicinity has at least three claimants. First the United States Government; Second Col. Wm. Muldrow, claiming all from Cape Mendocino to Point Reyes, some 2,600,000 acres, deriving his claim from the Russian government, through General Sutter, to whom he says he paid $60,000.00 for the deed. Third, 'Bulkhead' Parsons has covered thousands of acres with School Warrants and Indian Scrip." (Note: Oscar T. Shuck in his book "Representative Men of the Pacific" San Francisco, Bacon and Co., Publishers, 1870, p. 16, states that about 1841, General Sutter, who then was a Mexican citizen and had recently been given a grant to his land, "New Helvetia", by Governor Alvorado, was shortly after visited by Mr. Alexander Rotcheff, Governor of the Russian possessions, "Ross and Bodega," who during his stay offered to sell to General Sutter the Russian possessions, settlements and ranchos of Ross and Bodega. After examining them the purchase was made for $30,000.00. It is evidently to this that Col. Wm. Muldrow referred. General Sutter and his neglect by the United States government in Washington, will be mentioned later.)

Regardless of titles, prospectors had so far passed into that stage of intense interest, impulsive excitement and complete absorption in the physical problem of drilling wells, that titles were of secondary consideration. In that relation, however, they had difficulties ahead.

During the years 1865 and 1866 nearly forty wells were drilled in the southwestern part of Humboldt County, principally in the Bear River and Mattole valleys. The deepest of these was the Irwin Davis well, 1170 feet, and the next deepest was the Jeffrey Oil

OUTLIERS OF GRANITE, NEAR WHITE CREEK.

WHITE CREEK, about 25 miles north of Poso Creek. "Our hunters brought in several antelope and deer, and a small grizzly bear".



TEJON DEPOT CAMP.

TEJON CREEK flowed down out of Tejon Canyon. Several Indian rancherias were occupied. This point was beside the creek and about three miles from the San Joaquin Valley floor. Lieut. E. F. Beale, having been appointed superintendent of Indian Affairs for California, selected the Tejon as the most appropriate for an Indian Reservation. He encouraged the Indians to cultivate soil, and constructed a canal 5 feet wide, 3 feet deep and 10 miles in length. 1,900 acres in one field were sown with wheat and seven hundred Indians were at work upon it at one time.

Mining Company's well which was carried to 830 feet. An interesting feature of this development is that no producing well of the group was over 260 feet in depth.

Government Title Complications and Collapse Of Oil Boom

As oil and gas indications in Humboldt County existed on United States government lands, and there was no precedent for handling them, the following correspondence between the Land Office at Humboldt, California, and the General Land Office in Washington, is largely self-explanatory and is historically important as being the first order of its kind applying to prospective gas and oil lands:

"Letters of January 5, 1865, From Register and Receiver to Commissioner

Land Office
Humboldt, California
January 5, 1865.

Hon. J. M. Edmunds,
Commissioner, General Land Office,
Washington, D. C.

Sir:

We have the honor to report that petroleum or coal oil, has recently been discovered upon portions of the public lands lying in T. 2 S., Rs 1, 2 and 3 W., also T. 1 S., R. 2 W., Humboldt Meridian, the last recently surveyed under Act of Congress approved May 30, 1862. We are under the impression from all we can gather relative thereto, that petroleum or coal oil deposits in that section are extensive, and destined to become valuable.

In the absence of instructions or precedents applicable to cases of this kind we have thought it best to report the fact of such discoveries, and would respectfully ask for instructions thereto.

We enclose herewith a communication found in the Sacramento Union, from a resident of the section

OUTCROPPING BITUMINOUS SANDS to the north of the Port of Point Arena are similar to other sands found farther south, near Point Reyes and near Santa Cruz. At Point Arena these were first recognized by Porter O'Neal in 1864. (Photos by Walter Stalder, 1910 and 1918.)

where the oil is found, as it contains information relative to the subject of this letter.

Very respectfully,
Your obedient servant,
John Keleher,
Register.
William H. Pratt,
Receiver."

"Letter Of March 17, 1865, From Commissioner To Register and Receiver

March 17, 1865.

Register & Receiver,
Humboldt, California.

Gentlemen:

I have received your report of the 5th of January last, stating that "Petroleum or Coal Oil has recently been discovered upon portions of the public lands lying in T. 2 S., Rs. 1, 2 and 3 W., also T. 1 S., R. 2 W., Humboldt Meridian, the last recently surveyed under Act of Congress approved May 30, 1862."

That you 'are under the impression for all' you 'can gather relative thereto, that Petroleum or Coal Oil deposits in that section are extensive and destined to become valuable.'

At the same time you enclose Slips on the subject 'found in the Sacramento Union, from a resident of the section where the oil is found, as they contain information relative to the subject of this letter.'

It is not the policy of the Government to deal with Petroleum tracts as ordinary public lands, any more than with auriferous or other mineral or saline lands. Hence, you will report the exact description of any and all tracts strictly of the character you mention, and will withhold the same from disposal by the Government, unless otherwise specially instructed.

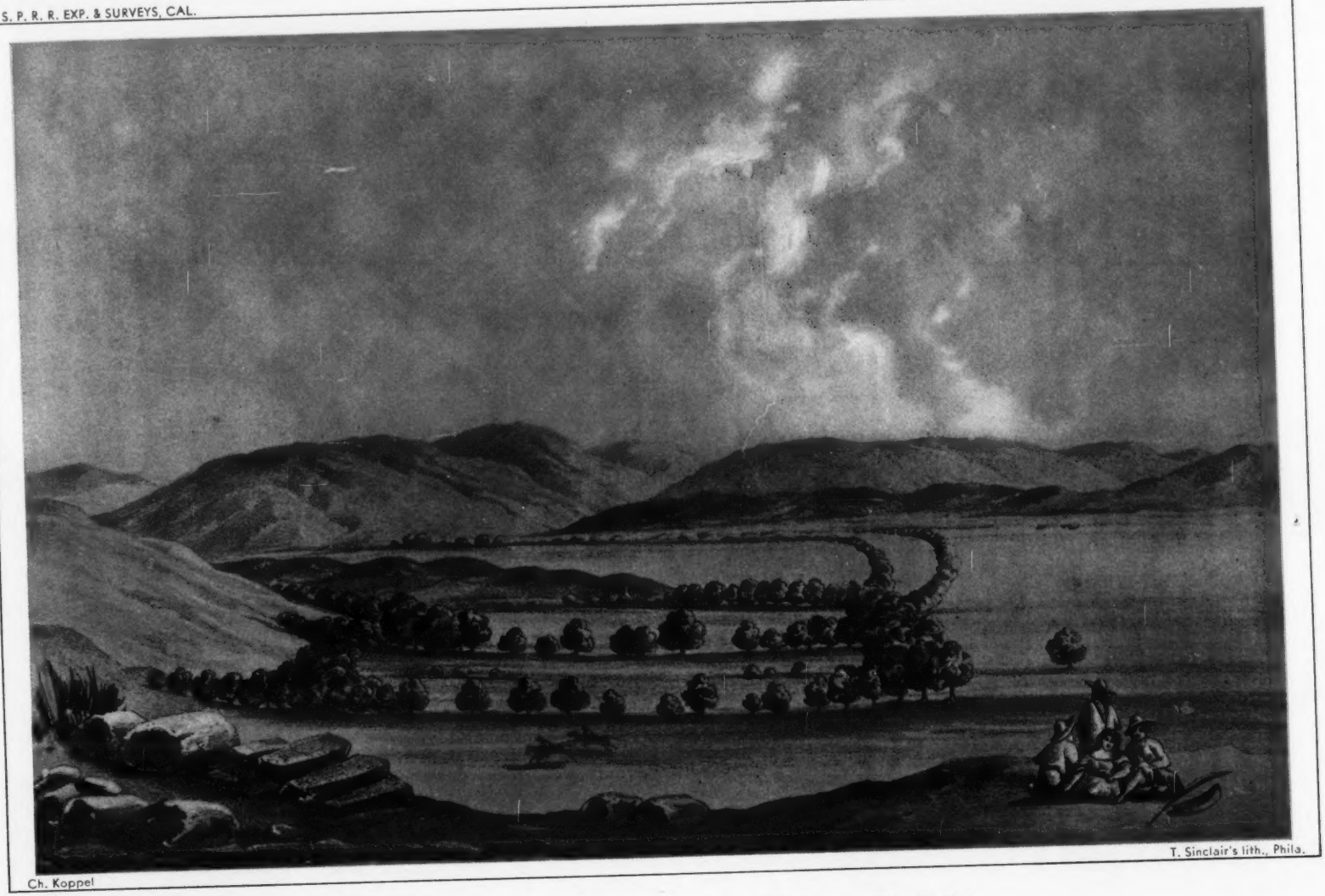
Very respectfully,
Your obedient servant,
J. M. Edmunds,
Commissioner."

At this time communications between Eastern and Pacific Coast points were slow. It was late, May, 1865, before the letter from the General Land Office reached San Francisco. (Min. & Sci. Press, May 27, 1865.) In the meantime the first oil prospect wells were well under way or about to begin operations, and the first oil was almost ready to be shipped. The result of this withholding of prospective government petroleum

→

TEJON RANCHO and entrance to Tejon Pass, at the southwest of the San Joaquin Valley, then called the Tulare Valley. Seen here is a geological field party. The horseback riders are rushing a report to headquarters telling that the geologists have made an important discovery. (She is in the center of the group). The first wagon road to Los Angeles from the San Joaquin led up through this pass, to the Mojave, past Elizabeth Lake, and over San Francisquito Pass. Fremont went over Tejon Pass in 1844.

U. S. P. R. R. EXP. & SURVEYS, CAL.



Ch. Koppel

T. Sinclair's lith., Phila.

ENTRANCE OF THE TEJON PASS AND A PORTION OF THE TEJON.

UNIV. OF MICH.

OUTCROPPING OIL SANDS near former "Medicinal" wells, in Sec. 31, T15N, R4W, Colusa County. It is these sands and others in the general neighborhood, that have prompted operators to drill test wells in the Rumsey Hills during the last two decades. As yet no test has been drilled to sufficient depth to reach pay sands. The Standard Oil Company of California Tippetts No. 1-1 well, now drilling on that structure, has these sands in prospect. (Photo by Walter Stalder, 1937.)

lands from disposal was to first cause great confusion among the prospecting companies, who were working on pre-empted or on homestead lands, and, to then discourage a much wider search with the shallow drilling equipment of that time. Mineral land locators were also prompt to file claims on lands under development. The enthusiasm that is always necessary to carry through the beginnings of such an enterprise was stunned and when the producing wells shortly developed sand, caving and water troubles, and were found to be small producers, the uncertainty of titles played no small part in discouraging further work with them.

At this same time there was excessive over-production in Pennsylvania, and the price of oil took such a drop that Pacific Coast refiners, with their initial California plants working on California oils, were finding it difficult to compete with kerosene shipped in from the east. However, the real pioneering spirit is tenacious and some of our early refineries carried on with oil derived mostly from what is now Ventura County. This will be discussed shortly.

By September 1866, all wells in Humboldt County were shut down, with one exception. Stanford Brothers who then controlled the Union Mattole Oil Company, and had to safeguard its land titles, bought a light steam rig that had been in use at the Jeffrey Oil Company well, and proceeded to drill a deeper test within a few feet of producing well No. 1 of the Union Mattole Oil Company. They were ready to prospect to 1000 feet if necessary. Their well was finished at 1003 feet in 1867 but found no oil below the depth of No. 1. Thus ended the first oil boom in California. (Note: During the fall of 1865 and 1866 the Mining and Scientific Press of San Francisco had a correspondent stationed at Petrolia to report on the various operations. It is largely through that journal that many of these early records are preserved.)

WELLS DRILLED (1865-1866) IN SOUTHWESTERN HUMBOLDT COUNTY, CALIFORNIA*

Name of Well	Sec.	T	R	M	Remarks
Scott & Parsons**	15	1 S	2 W	H	Also known as "Noble" well, Geo. W. Noble, Supt., J.W. Henderson, Mgr., 260′ produced about 5 barrels and caved.
Allen & Sutter** Petroleum Oil Co. (4 wells)	29, 30	1 S	2 W	H	Located in McNutt Gulch, Wm. Muldrow, Supt., succeeding Mr. Dukes. Wells suspended May 12, 1866.
North Fork**	25	1 S	2 W	H	Capt. W. C. Martin, Supt., 250½′. Produced about 30 barrels of oil.
Union Mattole Oil Co.** (2 wells, 1 pit)	30	1 S	1 W	H	Thos G. Richards, Pres., #1 Oil at 85′ deepened to 135′. 100 gals. daily. #2 197′ crooked at 85′. Small quantity of oil. Pit 20′ deep.
Union Mattole Oil Co.	30	1 S	1 W	H	1866-67. Stanford Bros. drilled to 1003′ without result.
Irwin Davis	33	1 S	2 W	H	Reported depth 1170′ deepest test in county 1866. No oil.
Paragon	30	1 S	1 W	H	T. G. Duff, Supt., 90′ dry.
Brown & Knowles	25	1 S	2 W	H	142′. Slight oil showing.
Fonner (3 wells) Mattole Pet. Co.	28, 33	2 S	1 W	H	150′ Located on North Fork of North Fork of Mattole River.
Jeffrey	28	1 S	2 W	H	830′ steam rig. H. Wentworth, Driller.

NEAR MONTICELLO, in eastern Napa County, are formations and oil seepages very similar to those in Humboldt County. Here the Napa Oil Company dug pits and drilled shallow wells. Small amounts of oil were found and could be pumped. (Photo taken in 1930.)

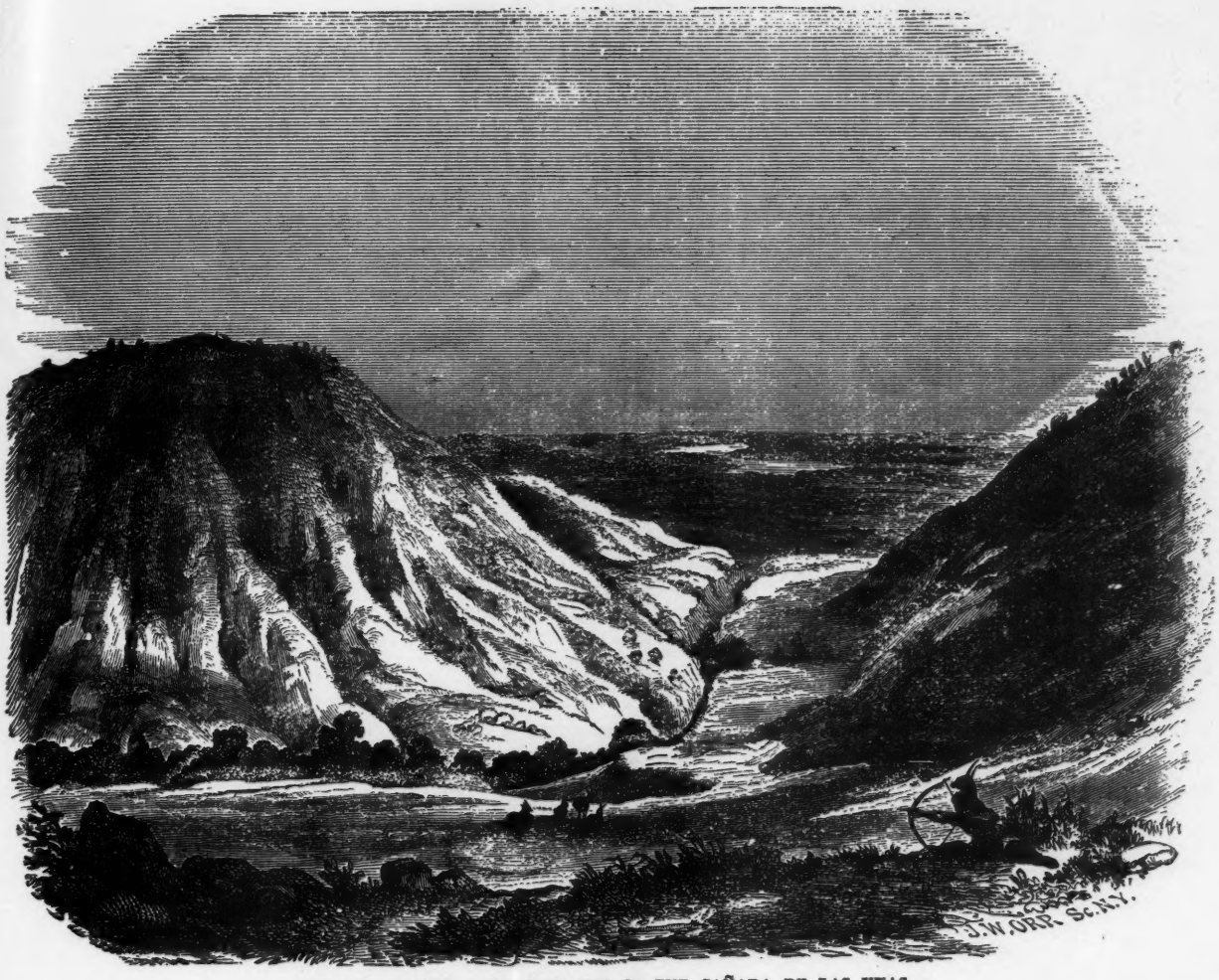
A VACANT LOT, at the corner of Chestnut and Taylor Streets, in San Francisco, with some hardened oil residues and scattered bricks, as a suggestion of its former use, marks the site where Stanford Brothers had their early refinery that distilled oil of 1865 from the Union Mattole Oil Company well of Humboldt County, and later distilled oil from Ventura County.

Name of Well	Sec.	T	R	M	Remarks
Buckeye	5	2 S	1 W	H	Located on Conklin Creek, Capt. W. C. Martin, Supt. 240′.
Hawley	21	1 N	2 W	H	Located on Bear River. Mr. Wattles, Supt., 355′ gas.
Davis					Located on Bear River. Wm. H. Smith, Supt. 316′.
Johnson Farm	19(?)	1 N	2 W	H	Located on Bear River. 100′.
Fortuna					Located on Bear River. Mr. Kirk, Supt. 340′. On Webster Farm.
Oil Creek Pet. Co. (2 wells)	22, 23	1 N	2 W	H	Located on Oil Creek at head of of northeast branch. Capt. Khyphausen Geer, Supt., later Mr. Pratt contracted second well. #1 150′.
Jennings					Bear River. Mr. Jennings, Supt.
Elkhorn Anneborgean Oil Co.					Bear River. Head of Upper North Fork of Mattole River.
East Fork Mattole Co. Sacramento					Shaft 40′ deep. Conklin Creek. 40′.
Betts Farm Well					5 miles up Mattole River from Petrolia. 201′.
Comet Pet. Co.					On Langdon Creek near Petrolia. 170′ oil indications all way.
Yosemite	28(?)	2 S	1 W	H	Upper Mattole 247′ gas escapes with roar.
Oil Creek (3 wells)					State Mineralogist mentions 5 wells in all but does not give location
EEL RIVER					
Eel River Oil Co. on J. T. Barber Farm					Chas. J. Barbar, Supt., 175′.

**—Shipped oil to San Francisco.
*—Data from Mining and Scientific Press and Humboldt Times, 1864-5-6 and State Mineralogists reports.

The subsequent story of Union Mattole Well No. 1 follows: In 1882 George Edmonstone acquired the surface rights to the lands which surround this well. At that time it was equipped for pumping and Mr. Edmonstone, in his loyal Scotch way, took great pride in keeping it so because of its historic relation to the early California oil industry, and of its interest and value to the community. Because it was within the boundaries of his cattle ranch he could occasionally inspect it when there. As time went on one of the residents of the district became curious as to just how the pump worked, and desired to know more about its underground set up and the oil in the well. One Fourth of July he quietly took some blocks, tackle and a horse to the site, connected the blocks between some overhanging trees and pulled the rods, tubing and pump from the well. The brass working barrel was found in good shape as was the well preserved oil soaked leather leg of an old boot that packed the pump to the inner walls of the casing. Mr. Edmonstone, with a sly twinkle in his eye later stated that this man, who really meant no harm, took the pumping parts away so that no one would steal them. At present they have drifted into the curio collection of a person who knows and appreciates their historic value. The top joint of the light casing of the well was thoughtfully replaced by some Pasadena people who were working at this property in 1935 and were cognizant of its historic interest. Oil may yet be dipped from the hole by using a can attached to a cord. (Note: Mr. Edmonstone, the cattle rancher, has since passed away. From old time residents the information has come that earlier in his life, Queen Victoria of England had personally presented him with a ribbon indicating his proficiency in playing the bag-pipe in competition with other lads. From the writer's acquaintance with him, his Scotch modesty would have prevented his ever mentioning this, only to very close friends.)

With the failure of any large commercial production from the shallow wells of Humboldt County, other



TULARE VALLEY, AND ENTRANCE OF THE CAÑADA DE LAS UVAS.

LOOKING DOWN GRAPEVINE CANYON to the San Joaquin Valley. Wheeler Ridge is to the left in the distance. At the foot of the canyon lived Antonio, one of the Chiefs of the Tejon Indians. "He received us very graciously, conversing in Spanish, and sold us a very fine watermelon, raised upon his ground. This place is at the entrance to the Canada de las Uvas, where there is also a small creek and the boulders were very abundant and of considerable size." The pipe line pump station of General Petroleum and of Richfield are now at the foot of the canyon; instead of the Indian game hunter, the motor cop now lies in wait, etc. About five miles up the canyon "One of the large oaks bears the following inscription, cut deeply into the hard wood: 'Peter le Beck, killed by a bear, Oct. 17, 1837'. While we were encamped here, an unusual number of grizzly bears were seen."

sources of crude oil which were suspected of promise in 1864, 1865, and 1866, were exploited.

Ventura County

In Ventura County the Philadelphia and California Petroleum Company (Col. Thos. A. Scott interest) undertook exploration on San Antonio Creek to the northwest of Sulphur Mountain in Rancho Ojai. Five wells were unsuccessful, but the sixth drilled in 1866 was reported as a flowing well with a very heavy product. These wells were drilled under the management of Thomas R. Bard. Well number six has been credited as being the first California gusher (Oil Weekly Nov. 7, 1921). Later information gives it a rating on settled production of about 20 barrels. (Data from Mr. W. W. Orcutt.) As far as checked, this would be the first drilled well in Southern California capable of commercial production.

In this same year (1866) the Philadelphia and California Petroleum Company made application to distill oil from springs, but general financial conditions at the end of the war plus the uncertainties of his wild-cat wells, caused Col. Thomas A. Scott to send out word to close down all operations for the time in California. This order applied to exploration in Humboldt County as well as Ventura County. Since his lands were owned in fee there were no drilling obligations and he could wait.

The asphalt seepages on Sulphur Mountain in Ventura County had attraction for the camphene distillers of San Francisco. Charles Stott exploited them with

pits and trenches and started a refinery in Santa Paula in 1866. Hayward and Coleman also exploited them and shipped crude oil thus obtained to their San Francisco plant.

Simultaneously with developments in Humboldt County, Stanford Brothers exploited the Sulphur Mountain seepages. On the flanks of this eminence such seepages are numerous and the accompanying strata are steeply tilted. The idea was conceived of tunneling into the mountainside and tapping as many of the oil bearing strata as possible. A tunnel was accordingly located near the head of the westerly branch of Saltmarsh Canyon on Rancho Ex-Mission San Buenaventura, about 8 miles northwest of the town of Santa Paula. It was drifted for a distance of 60 feet and from the sands tapped, a production of from 3 to 4 barrels per day was developed. (Data from W. W. Orcutt.) This material, together with seepage oil from pits and trenches, was shipped to their San Francisco refinery and formed a part of the crude oil supply for their stills. The tunnel was driven in 1865-1866. (Note: From a Ventura County source the location of this tunnel was questioned. In support of the Saltmarsh Canyon location, Miss Gertrude Stanford, daughter of Josiah Stanford, advised the writer that as a girl, aged nine years, she distinctly remembered the departure of her father and mother on the stage coach for Santa Barbara in the drought year of 1866. On their return they told of their tunnel in Mr. Saltmarsh's Canyon. The oddity of this man's name made a distinct impression on her as did also their description of the explosions of escaping gas in the drift. As an incidental notation another of her interesting recollections is that Mr. Salmi Morse and his wife were mentioned as being at the property, with Mr. Morse in charge of the project and his wife superintending the culinary department. They were a much traveled couple of the world and had been guests at the Stanford home on Bush Street in San Francisco. Salmi Morse, among other achievements, was a theatrical man, and had produced the Passion Play in San Francisco. This had aroused strong opposition from many religiously minded church people who strongly resented Christ being represented on a public stage for commercial profit. As a result Salmi Morse was very much embarrassed. Miss Stanford's father had placed him in charge of the oil project in Saltmarsh Canyon, and his wife had loyally joined to lend her personality and attainments to the success of the venture. While thus occupied in interesting and pleasant surroundings, his absence from San Francisco had afforded time for the matter to adjust itself.)

What confidence Stanford Brothers had in the refining of this crude oil of Sulphur Mountain for its illuminating fractions, is indicated in an advertisement which appeared on July 14, 1866, in the Mining and Scientific Press, and in local San Francisco publications:

"Stanford Brothers
Refiners and Packers
of
Comet Oil!
from
California Petroleum

"We warrant this oil to be superior to any eastern

A STOCK CERTIFICATE of one of the first wells in California to ship oil. (Courtesy of E. R. Leach, son of F. A. Leach, original owner of the certificate).

oil, and any purchaser finding it to be not as represented, can return the same at our expense, and the purchase money will be refunded, together with all charges.

"Stanford Brothers,
123 California Street."

The San Jose Mercury under date of November 6, 1865, stated " * * * The amount of coal oil shipped from San Buena Ventura to San Francisco for the month of October is as follows: Hayward & Co., 124 barrels of 45 gallons each; Stanford & Co., 23 barrels; and Thomas Sprague, 17 barrels. Hayward & Co. have 150 barrels more ready for shipment. This oil is all the natural flow from the oil springs in that section. The amount collected now amounts to more than 250 barrels per month." (Note: These figures were evidently before the oil tunnels were run.)

Tulare County

The asphalt seepages of what is now the McKittrick oil field in Kern County, were known to many early cattle men of the San Joaquin Valley. In 1864 the area was known as Buena Vista and was then in Tulare County. This was a desolate locality typical of the San Joaquin Valley with its own scenic attractions for those who enjoy the open spaces. It was reached by road from San Luis Obispo, or also by road from Woodville, across dusty hot plains in summer and with more comfort, but with frequent mud holes in winter. Some of the inviting features were the wild flowers in springtime, the solitude of the grassy plain with its colorful evening sunsets and starlight nights, the abundance of elk, deer, antelope, and bear, with ducks in the sloughs and other small game about the sage brush on the plains or in the surrounding hills. Being attracted by the asphalt seepages, two explorers, Messrs. Stephen Bond and F. Benoist, attempted to drill a well in 1864, but it was a failure when the bit became hopelessly stuck in the hole. They were persevering, however, and put down pits, from which they produced oil. Their claims embraced Sections 19, 20 and 29, T. 30 S., R. 22 E., M.D.M. The pits were usually 20 feet deep, 5 feet wide, and 8 feet long; each produced in 24 hours about 300 gallons of crude oil containing 40% light and 50% heavy or lubricating oil. The claim was worked from February, 1864, to April, 1867, when the local demand was fully supplied and the low price of oil and the high cost of transportation made its preparation for the San Francisco market unprofitable. (J. Ross Browne Report on the Mineral Resources of the States and Territories west of the Rocky Mountains, Washington, 1868, p. 263 and Hanks, H. G., California State Mineralogist's Report 1884, p. 296.)

Santa Clara County

(Note: Had the original operators been experienced, Santa Clara would possibly have been the first California county to go on steady commercial production.

DIPPING OIL from the historic Union Mattole Oil Company well of 1865, Humboldt County, Calif. (Photo by Walter Stalder, 1935.)

The Mining and Scientific Press November 30, 1861, quoted:

"Important Discoveries in Santa Clara.

"The San Jose Mercury of a late date, has the following: 'The discovery of coal oil, silver and copper in the Coast Range is creating quite an excitement among some of our Santa Clara people. An oil spring near Moody's mill on the Santa Cruz road is really worthy of attention. No one had any knowledge of it until recently. Here is the history of its discovery. Some men were felling timber for saw logs. They noticed on felling a tree across a piece of ground that the water, as they supposed, shot up from the ground as the result of the concussion. Directly after this a very unpleasant smell was perceptible. This led to an examination, when a small hole was dug, which filled with something that resembled oil. Taking some home they found that it would ignite. Some of it was taken to a chemist and he pronounced it an excellent article of oil in a crude state. * * * This led to a further search and some other springs have been discovered'."

It was 1865 before any real effort was made to develop this discovery. In April of that year the Santa Clara Petroleum Company was drilling, and the Shaw and Weldon Petroleum Company had encountered, some oil in a 30 foot shaft, and were preparing to drill from that point on. In September the Pacific Petroleum Company filed its articles of incorporation to operate near Lexington. On October 19, 1865, the San Jose Mercury stated: "There are rumors of rich strikes in oil at Lexington, in this county. We learn that one shipment of sixty gallons of oil was sent to San Francisco a few days since, the product of a Lexington well. The petroleum is a number one article."

On October 11, 1865, the Alta California stated: " * * * the Lexington well near San Jose shipped last week one hundred and twenty gallons to New York to show the excellent character of our oil." (Note: Lexington was the busy village around which the lumbering industry of the Moody Gulch district centered,

LOOKING EAST AT RUMSEY HILLS from Capay Valley. (Yolo County, California.) The Rumsey Hills (Nigger Heaven Dome) structure is a faulted anticline. The steep bluffs near the top of the ridge in the left center of the photo are along the fault. Care has been taken to locate wells to the east of this fault. Early drilling equipment could not have reached underlying oil sands. Modern equipment is capable of so doing and hence the renewed activity. (Photo by Walter Stalder, 1932.)

as also did the embryo oil industry of that time. As the timber disappeared from the surrounding hills and gulches it gradually became one of California's early "ghost" towns.)

The Santa Clara Petroleum Company well, also known as the "McLeran well" from the name of its superintendent, G. B. McLeran, was drilled to a depth of 470 feet and encountered eleven different oil sands, one of which was estimated as good for five barrels a day. These were cased off. No water was found in the hole, but it was so crooked that the drilling line cut through the casing. At 150 feet oil filled the well almost to the top and rose higher and higher as each successive sand was cut. In February, 1866, it was rated as a three to five barrel well as it stood with most of the sands cased off behind the pipe. The hole was full of oil and the tanks had oil in them, but the work was suspended. (Min. & Sci. Press, June 24, 1865, and San Jose Mercury Feb. 1, 1866.)

At this same time the Shaw well on property adjacent to the McLeran and the Gould and Pulcifer wells, two miles west of Lexington, were also operating. (San Jose Mercury Feb. 1, 1866.)

The McLeran well demonstrated in no unmistakable manner that commercial oil existed in the Moody Gulch area, but it also indicated that more experienced operators would be required to satisfactorily handle the drilling and production. It was not until 1878 that it received such attention as will be described later.

At the Sargent Ranch (Sec. 26, T. 11 S., R. 3 E., M. D.B. & M.) also in Santa Clara County, are some excellent seepages of asphalt oil at and near the contact of organic shales with serpentine. In 1864 and 1865, pits were dug in these seepage areas and works were erected to distill kerosene. The operation was successful for a time, but eventually halted.

Santa Cruz County

Six retorts were erected on the Medar Ranch at Santa Cruz in 1864 by the the Santa Cruz Petroleum Company to convert the asphaltum there found into kerosene, and lubricating oil, grease, etc. This was not any more successful than wells drilled by the same company. The production of bituminous rock from the area soon started and is still a commercial mineral product of the county. The first well of the Santa Cruz Petroleum Company was drilled under the superintendence of Mr. Sevenoaks who later drilled other unsuccessful prospect wells in this area.

Contra Costa County

A description of a well drilled to 87 feet in 1862 on the west bank of San Pablo Creek, at a location about four miles slightly south of east of the town of San Pablo, is given by J. D. Whitney. He states that this is the first well to be drilled for oil in California and mentions the erection of a works at this locality for the purpose of distilling the bituminous matter in the outcropping rocks. This work was evidently not a success. (Note: At a point on San Pablo Creek a little north of east from San Pablo, where the road to Sobrante leaves the San Pablo Creek road, and on the north bank of the creek, is the only outcropping that could be found in the field to correspond in some manner to Whitney's description. When Whitney gave this well as the first to be drilled for oil in California he was evidently not aware of the location on the Davis ranch in Humboldt County, where drilling was started in 1861, as already mentioned in the present narrative. The first of anything, as described, must always be subject to new information, and the writer would not be surprised if somewhere in California some ambitious pioneer may have quietly started drilling for oil even before 1861.)

Coal was being developed to the north of Mt. Diablo for California consumption at the same time that a well was being planned in the area for oil in the latter part of 1864. Evidently an oil seepage had been discovered by the prospectors who were searching for

coal outcrops. The Mining and Scientific Press under date of December 10, 1864, states: "New Petroleum Company—The Adams Petroleum Oil Company filed their certificate of incorporation in the office of the clerk of the County Court House on Monday last. Their object is to work the mines of petroleum and petroleum oil situated in the SW ¼ of Sec. 15, T. 1 N., R. 1 E., M.D.B. & M. The capital stock of the company is $300,000.00 which is divided into 200 shares of $1,500.00 each. The trustees are Philip Wolf, S. B. Whipple and James T. Cruickshank."

Philip Wolf was a coal dealer of San Francisco, S. B. Whipple was agent for the Union Coal Company and also a coal dealer in San Francisco, and James Cruickshank was identified with the coal mining operations of Contra Costa County.

The well drilled by this company encountered small quantities of oil, had considerable trouble with equipment and the project was discontinued.

In 1865 Kirk and Little, well contractors, started a well about 1 mile from San Pablo for the San Pablo Petroleum Company. This was not successful.

Marin County

Under date of April 1, 1865, the Mining and Scientific Press stated: "Messrs. Kirk and Little have commenced boring a well for the Bolinas Oil Company, located at the point at the entrance of Bolinas Bay, Marin County. This is a company which has recently been organized in this city. The capital has already been paid in for an efficient development of their claim. They are now down 60 ft.

"The Arroyo Hondo is the name of another company located on the Bolinas grant in Marin County, about three miles from the first mentioned company, also on the coast. This company is made up of quite a number of San Francisco capitalists, among whom may be mentioned W. T. Coleman, Louis McLane, S. F. Butterworth, George Hearst and others. Messrs. Kirk and Little sent up boring tools last Tuesday to commence work for that company. Work upon the well will be prosecuted with all possible dispatch."

Neither of these wells was successful. Both were evidently projected because of the asphalt sands which outcrop on the Point Reyes Peninsula, and of the tar seepage near the entrance to Bolinas Bay. The outcrops are here quite similar to others at Point Arena and at Santa Cruz. With the equipment for drilling wells at this time, these tests could hardly be considered conclusive.

San Mateo County

An early note on oil in San Mateo County was found in the Mining and Scientific Press of May 6, 1865, p. 279.

"We understand that oil has been discovered on Bell's ranch, about fifteen miles below Halfmoon Bay, where oil has previously been discovered on Purisima Creek."

A tunnel was run on Purisima Creek and a little oil, but nothing commercial was encountered. At Bellvale a well was drilled and reported a little oil, but also not in commercial amounts. Later developments

THE SCIENTIFICALLY LOCATED MUTUAL OIL COMPANY WELL near the axis of Sites anticline (Sec. 31, T18N, R4W, M.D.). Extremely high pressure gas sands, and inter-stratified water sands, made drilling both difficult and expensive. Known oil sands which outcrop farther to the south in Colusa County were evidently passed through in this well, as in a second drilled nearby, but both were abandoned without testing. Knowledge of the outcropping oil sands, and the history of these wells, added sound reasons for developments at the Sutter Buttes some twenty-five miles to the southeast, where a discovery gas well was brought in in 1933.

at Purisima resulted in the successful development of small wells as will be discussed later.

Point Arena

In 1854 there emigrated to California from Indiana, Thomas O'Neal and his family. They settled at Point Arena in March, 1857, on lands that Thomas O'Neal and his son Porter later homesteaded. Most of this land was wooded, and in going over it one day, the O'Neal boys noticed a black sticky sand adhering to the exposed roots of a fallen pine tree. They were familiar with coal and the first thought was that it might be some variety of that substance. On introducing the material to a fire it first melted and then burned. They then sunk a pit where the tree had grown. At six feet they found the black sand and sunk into it four feet deeper. It was finally called a tar sand because of the liquid tar which they then found associated with it.

They next followed the bed and bluff of the small creek on which this tar sand was discovered, and found other outcropping tar sands under the brush. They also investigated some dark colored sands which prominently outcrop in the bluffs to the north of the Port of Point Arena, and found them to be of the same tarry nature when dug into.

News of their discoveries reached San Francisco probably through the captain of some sailing vessel that called at Point Arena harbor and, early in 1864, a French chemist from San Francisco, Mr. Benoist, arrived at Point Arena. He was directed to Porter O'Neal, and together, all outcrops were investigated and more pits were dug. (Note: Porter O'Neal knew Mr. Benoist by the name of Ferdinand. The San Francisco city directory of 1866 gives the initial "E" before his name, which they spell with two "n's". Mr. Benoist's name in other publications is spelled with only one "n" but he is referred to simply as Mr. Benoist. Because of the above there is a question as to the accuracy of his listing in the early San Francisco city directory.)

Mr. Benoist had with him a metal still that fitted one of the openings in the top of an ordinary cook stove. He also had a worm that fitted into a water barrel for condensing purposes, with proper packing for an exit hole for the worm in the lower side of the barrel. In due course this distilling apparatus was set up in Porter O'Neal's cabin, charged with bituminous sand, and a fire started. Mr. Benoist shortly stated that the fire was not sufficiently hot so Porter O'Neal secured some pitchy pine knots and introduced them to the fire box. Suddenly there were intermittent explosions in the still and an oily froth exuded from the delivery pipe in the lower end of the barrel to shoot out with each explosion. Ferdinand Benoist became excited. "Too hot! Too hot!" he cried, as he ran about the cabin swinging his arms and ejaculating, in French, words that Porter O'Neal did not exactly understand, but imagined might be akin to swearing in a foreign language. In due course the explosions ceased and a slightly discolored liquid distilled over. This liquid Benoist then pronounced burning oil. (Note: What Porter O'Neal experienced was what is known to refiners as a "puking still." The oil or tar had water with it. The temperature of this tar became greater than that of boiling water. As the associated water distilled some of it condensed on the upper surface of the still and dropped back to the superheated top of the liquid tar. These drops of water were immediately converted to steam with the resultant explosions that Porter O'Neal heard and the frothing that he saw. After the water was all distilled off, conditions within the still were normal. This same phenomenon frequently observed by a young farmer boy from Michigan while working at the Union Oil Company plant at Oleum, California, some forty-five years later, caused him to experiment with small model refineries that he made with sheet tin, a pair of tin snips, a soldering iron and solder, in his living quarters after working hours each night. He used a small still with an alcohol lamp, as a source of heat, and from his experimental plants evolved one of the most ingenious distilling plants, with expansion tower for the frothing oil and heat exchangers for the condensing system, that had to that time been invented. That farmer boy was the late Milton J. Trumble, whose system was later used in some of the largest oil refineries. What Benoist became excited about Trumble turned to good account.)

Under date of March, 1864, the Point Arena Oil Company was organized with a capital stock of $700,000 (7,000 shares @ $100.00). R. J. Tobin, Pres.; D. S. Cutter, Secy.; S. B. Campbell, David Beebee, T. S. Bennett, R. J. Tobin and A. R. Briggs, Trustees. They had over 1,000 acres in company's claims, and stated that the petroleum deposit was quite similar to that at Santa Cruz, occurring as a mass of saturated sand, but richer in petroleum. (Min. & Sci. Press March 5, 1864, P. 148.) This is evidently the group that sent Ferdinand Benoist, San Francisco petroleum chemist, to Point Arena.

Mr. Benoist later erected a small still near the Point Arena wharf, but this early effort proved abortive because it was impossible to compete with liquid tarry oils by distilling those bituminous sands.

This ended the early exploration at Point Arena and it was not until just prior to the turn of the century that work again started there. (Data from personal contact of the writer with Porter O'Neal and his son Thomas O'Neal.)

Colusa County

It was the early discovery of oil seepages along Bear Creek and its tributaries in T. 15 N., R. 5 W. M.D. and of gas seepages in Antelope Valley near the present town of Sites Tps. 17 and 18 N., R. 4 W., M.D., that attracted the prospectors of 1865-66 to Colusa County.

The Seepages along Bear Creek occur at and near the contact of intrusive serpentine into highly tilted shales and sandstones. These seepages are small and unless the oil rises in a pool of still water to gather and make a good showing, the only evidence is sometimes a dark greasy spot in the rocks, or when, occurring in the creek, an occasional globule rising to the surface forming a temporary rainbow and washing away down stream. (Note: An interesting feature of such areas where serpentine has intruded sedimentary rocks is that many quicksilver deposits of California are found under somewhat the same geologic conditions and in working the ore miners very frequently have gas and oil to contend with. Among such mines are the Abbott in Lake County, within a very short distance of the oil seepages on Bear Creek, Colusa County, the Knoxville of Napa, the St. Johns of Solano, the Reed of Yolo, the New Almaden of Santa Clara and the Skaggs Springs of Sonoma.)

The gas seepages of Antelope Valley were early noted because of inflammable bubbles coming up with salt water springs and also in creeks.

Wells of 1865-66 along Bear Creek were all shallow. In this neighborhood Mr. Sevenoaks, who had drilled the first exploratory well at Santa Cruz for the Santa Cruz Petroleum Company, leased Emerson Springs. As a preliminary, he dug out the spring and collected five gallons of oil from it. (Min. & Sci. Press July 24, 1865.) The Empire Oil Company was organized to drill on Bear Creek. At Botts Springs a well at thirty feet found oil and water. On Sulphur Springs Creek, a tributary of Bear Creek at Wilbur Springs, Messrs. Rowe and Fleeson drilled to 110 feet and expected to pump. They were also considering installing a water power for drilling. Others were also interested in the area, but nothing commercial resulted.

In Antelope (Min. & Sci. Press Sat., Nov. 18, 1865) the Antelope Valley Petroleum Company, M. S. Whitney, president, was reported as down 200 feet, working with a spring pole. The Shepardson and Lightner well was drilling by horsepower. And the Louis and Lewis well was drilling at 165 feet in hard rock.

While none of these wells was commercial they were nevertheless drilled in an area which has received later attention and will certainly be tested more thoroughly in the future. This will be discussed later.

Sutter County

Early in the exploration for gas and oil the gas seepages at the Sutter (Marysville) Buttes were found and explored. (Note: To all early Northern Californians and their descendents, this intrusion of volcanic rocks, with its surrounding ring of sediments, that rises out of the Sacramento Valley to a maximum height of 2037 feet in South Butte to form the most conspicuous topographic feature of that basin, was always known as the Sutter Buttes. These buttes were early named after General John A. Sutter, who owned, under a Spanish grant, what was known as "New Helvetia," and embraced a large part of the eastern Sacramento Valley in the neighborhood of and including the present city of Sacramento. When the United States Government signed with Mexico the treaty at the close of the Mexican War, it agreed to recognize and protect all such property. It was at Sutter's Mill that James W. Marshall found gold in 1848 and brought about the great gold rush to California in 1849 and 1850. At that time General Sutter was one of the best friends that these immigrants had. Some of these newcomers, however, did not respect his property. They forcibly entered his land, cut and sold his wood and used his grass under the plea that this land was vacant and unappropriated. His lands were preempted. His horses were stolen. His cattle, sheep and hogs were stolen and butchered and the meat sold to immigrants. With nearly his whole estate soon so swept away, General Sutter removed to the west bank of the Feather River

WELL NO. 1 OF THE BUTTES OILFIELDS, INC., was spudded October 16, 1932, and brought in as a gas well February 9, 1933. It produced from cracked shales as anticipated. This was the high pressure water free discovery gas well for Northern California. To date, six wells have been drilled. Later wells are away from the core and produce from lateral sands, as also anticipated for this structure.

and took up his residence at Hock Farm. (Oscar T. Shuck, Representative Men of the Pacific, Bacon & Co., San Francisco, 1870, pp. 19-21.) His efforts to secure redress in Washington were fruitless. In addition, no one can estimate the amount of gold mined and stolen from his lands. After such treatment, a board in Washington later changed the name of Sutter Buttes to Marysville Buttes. This act was and has since been strongly resented by native Californians of the Sacramento Valley and by their descendants. To them the name Sutter Buttes still applies. They feel that if Lassen's Peak, Fremont's Peak, Mt. Whitney, Mt. Tyndall and other prominent Californian mountains can be named after prominent men, surely the name of General John A. Sutter, who received such shameful treatment, is entitled to continue to be likewise so honored in "Sutter Buttes.")

Dexter B. Cook was a worker about the Sutter Buttes, who built many of the stone walls and dug water wells for the farmers. He was a strong, honest workman, who commanded the respect of the settlers. The willow switch was used by him to locate his water wells. When working, he traveled about from his home near West Butte trundling his tools in a push cart. In 1864, when a gas seepage was discovered on the south side of the Sutter Buttes at a contact of sedimentary rocks, with the igneous rocks forming the core, it was to Dexter Cook that the problem of locating the shaft and planning its development devolved. The results of this work were described in the Marysville Appeal of February 28, 1866, and follow:

"Sutter County Gas Works.—A correspondent sends the Appeal the following: I visited last evening in company with some dozen ladies and gentlemen, the wonderful gas mines of the Butte mountain, which far surpass anything I have ever beheld. But to give your readers an intelligent account, let me go back to the commencement of the work on this wonderful and soon to be, valuable mine. Some eighteen months or two years ago a company, composed of Dexter B. Cook, William Doty, J. M. Cope and others, commenced work in what is known as the "Pass" of the Buttes. From indications found on the surface, they were led to believe that the place was rich, either in coal or oil. The indications were shale in abundance, water strongly impregnated with something very much like that which you find coming out of coal banks (the geological name I didn't know, it being between sulphur and oil) and the entire surface of the ground so charged with gas that you could light it with a match most any place. The first shaft was sunk some thirty feet; from this the company commenced to run a tunnel into the hill. After running some twenty feet the gas accumulated to such an amount that it took fire from the light and an explosion, like the discharge of a six-pounder, was the result. It came near killing two of the workmen—one evidently burnt and the other thrown out of the shaft (an account of which was published in the Appeal, at the time). This work was abandoned, and a new shaft commenced higher upon the hill, with the intention of tapping the tunnel run from the first shaft. After sinking some thirty feet the company employed machinery for the further prosecution of the work. The machinery and drill used were manufactured at the company's shop, and for durability, simplicity and effectiveness, are not surpassed by any on the coast. Almost from the time they commenced to bore, the gas came up with force sufficient to clear the hole of the drillings, and forced the water that stood in the shaft from ten to fourteen inches high. The gas continued to grow stronger and stronger until they reached a point sixty-five feet below the surface. Here the drill, or auger, got wedged, and notwithstanding every effort was made to draw it out of the hole, all failed and the well had to be abandoned. The company then thought they would see what amount of gas escaped from the well. The top of the shaft was covered with boards; two pipes were passed down through the covering—one three inches and the other one inch. The boards were then covered with dirt, thus forcing the gas through the pipes. What the quantity is that passes through these pipes I am unable to say. The gas has been escaping from this hole for more than a year, and yet the supply is now as great, or greater, than at any previous time. When lighted, the flame from the smaller pipe reaches about twenty inches in length—the three-inch pipe sends forth a continuous

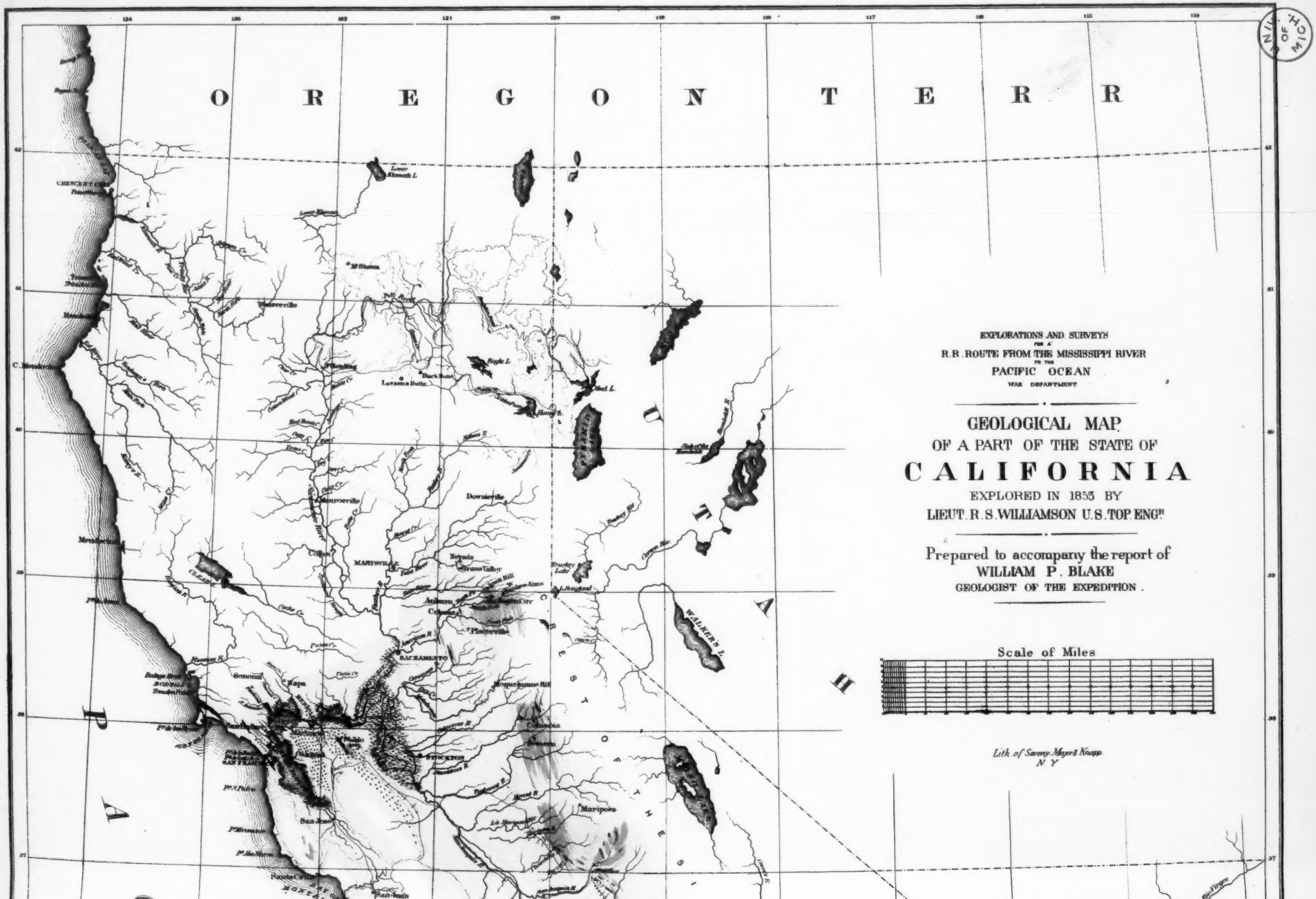
→

IN MAY, 1853, the then Secretary of War, Mr. Jefferson Davis, directed Lieutenant R. S. Williamson to organize a party to operate in California, to survey and explore the country lying west of the lower Colorado, and to ascertain a railroad route connecting that portion of California with the Pacific Ocean. One member of the party was to be a mineralogist and geologist. Mr. W. P. Blake was engaged for this important post. This geological map is contained in Volume V of "Reports of Explorations and Surveys, to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean, made under the direction of the Secretary of War, in 1853-54."

(Note to Ed.: My records of Blake are fragmentary. He remained in California after the completion of this work; or at least he returned, because he was a candidate for head of the California State Geological Survey, organized in the '60's, a job which Whitney succeeded in getting. Blake went to Japan for about two years of geological work and then returned to California. He wanted very much to be in the Survey organization, but failed to connect. At least, that appears to be the case from some memos in the Brewer unpublished papers relating to the early days of geological work in California). This map will reward study. It omits Fort Bragg and the other old Russian trading posts along the coast north of San Francisco. It shows Lake Tahoe as "Truckee Lake" and entirely in Nevada. The blue color shows the limestone of the Mother Lode. This limestone is well mapped, and at that time it was being quarried. It may still be seen on the sidewalks in the old mining town of Columbia. The headwaters of the Kern River are shown as being in the vicinity of Walkers Pass, instead of much farther to the north. Blake indicated the Tertiary formations which are the source of San Joaquin Valley oil. He described the seepages of oil and their uses for water-proofing roofs in the vicinity of Los Angeles. On another map he even identified the Eocene outcrops in the vicinity of Grapevine Canyon at the southern border of the San Joaquin Valley.

CALIFORNIA
EXPLORED IN 1853 BY
LIEUT. R. S. WILLIAMSON U.S. TOP. ENGR.
Prepared to accompany the report of
WILLIAM P. BLAKE
GEOLOGIST OF THE EXPEDITION.
Scale of Miles
Lith. of Sarony, Major & Knapp N.Y.
PACIFIC OCEAN
GREAT BASIN
NEW MEXICO
Granitic and Metamorphic
Erupted Granite and Syenite.
Serpentine, Trap, Greenstone and Porphyry.
Basaltic Lava. (Found in a table Land or Plateau at Fort Miller and at many points further north, not represented on the map.)
Metamorphic Slates, chiefly Clay Slate & Talcose Slate (Azoic?)
White and crystalline Limestone. (Metamorphic.)
Tertiary and Quaternary. (The sands and detritus or drift of the Great Basin and the Coast slopes generally rest upon or cover the Tertiary strata.)
Tertiary (Horizontal strata at Carpenteria, but upraised at other localities. Includes the San Francisco Sandstone.)
Alluvium. (Lacustrine Clay of the Colorado Desert and of the Tulare Valley.)
Lithographed for
CALIFORNIA OIL WORLD
1941

Granitic and Metamorphic
Erupted Granite and Syenite
GREAT BASIN
NEW MEX
COLORADO RIVER
Monterey
San Miguel
San Luis Obispo
La Purissima
Santa Barbara
Los Angeles
San Gabriel
Goodvills
Tejon
Tulare L.
Tachi L.
Buena Vista L.
Owens L.
Mohave R.
Colorado R.
Rio Virgen


O R E G O N T E R R
U T A H
EXPLORATIONS AND SURVEYS
FOR A
R.R. ROUTE FROM THE MISSISSIPPI RIVER
TO THE
PACIFIC OCEAN
WAR DEPARTMENT
GEOLOGICAL MAP
OF A PART OF THE STATE OF
CALIFORNIA
EXPLORED IN 1853 BY
LIEUT. R. S. WILLIAMSON U.S. TOP. ENGR.
Prepared to accompany the report of
WILLIAM P. BLAKE
GEOLOGIST OF THE EXPEDITION.
Scale of Miles
Lith. of Sarony, Major & Knapp
N Y
Sacramento
Marysville
Downieville
Stockton
Mariposa
Walker's L.
Pyramid L.
Mt Shasta

blaze between four and five feet high. It is one of the most beautiful lights you ever beheld. Some six inches next to the pipe it is of a beautiful pale blue, from thence up it is much like that made from the best of coal gas. It is perfectly agreeable to the eye, free from smell, and strangest of all, from smoke. As we stood there last night, in that beautiful mellow light, with the valley and hill top lighted up by Nature's own gas works, we beheld one of the most beautiful and romantic sights it has ever been our lot to behold. This place is well worthy of a visit from those who take an interest in the curiosities of Nature. What is to be done with this never-failing supply of gas? There is enough on this one hillside to light all the cities on the coast. Since they are talking of moving the State capitol, would it not be well to advocate the claims of West Butte. In giving up this well the company has lost all the work done in the last two years, yet they are not in the least discouraged. They feel satisfied that sooner or later they will open a flowing well. They are worthy of success. They have a new well already down some twelve feet and are rapidly pushing it forward. Pennsylvania oil miners have visited this place and say there is no doubt but that there is oil here. Will not some of our scientific men pay this singular locality a visit? As the work continues from time to time, you may expect to hear from

"Ozark."

The work was evidently not continued at that time for "Ozark" sent no further communications. This development, however, was the forerunner of later successful exploration that initiated the first real extensive gas developments in Northern California, as will be mentioned later.

Dexter Cook lived to be an elderly man, but after the explosion in the gas tunnel he could never be induced to do further work on the gas and oil prospect. He was very much stooped and it was the impression of some people that this was due to injuries received in the tunnel explosion. However, those who knew him, attribute this condition to the hard work that he followed. One of his best friends stated that Cook was not injured in the explosion, but was surely frightened. He also mentioned a passage from Mark Twain's "A Yankee in King Arthur's Court," where, after a certain explosion, the tracks were all outward bound. (Data from James D. Carroll of West Butte, Sutter County, Calif.)

Pennsylvania's Product Cripples Early California Oil Industry Until 1875

The condition of the California oil industry in 1868 was very fortunately reviewed by J. Ross Browne (Mineral Resources of the States and Territories West of the Rocky Mountains, Washington. Government Printing Office 1868, pp. 261-264.):

"The manufacture of Coal Oil in California—Small quantities of coal oil have been made in this state for many years. The materials in some localities require but little preparation for illuminating purposes. Between 1865 and 1867 Hayward and Coleman, a firm in the oil business in San Francisco, made 40,000 gallons of illuminating oil from springs of petroleum near Santa Barbara; but suspended operations in June, 1867, because imported oil was selling at 54 and 55 cents per gallon, a price so low as to render the manufacture unprofitable, owing to the high price of cases to contain it, transportation, and labor.

"These gentlemen have expended capital and labor to render valuable the California petroleum. After many experiments to test its adaptability for fuel, they state that, although it costs $5 per barrel to bring it from the springs to San Francisco, it is cheaper as fuel than coal or wood. It saves expense of hauling and splitting, and feeding the furnace; it makes no ashes to be carted away; causes no waste in lighting or extinguishing the fire; while with wood or coal there is waste of time and material in these operations. The heat is under control, and may be easily regulated. The operations of this firm have been carried on for a year with petroleum as fuel, for distillation and driving their engines, thus establishing the practicability of its use.

"A number of establishments in the southern counties also use it for running machinery. A gentleman interested in the oil business had recently perfected an apparatus for burning it for domestic purposes. He had made application for a patent. This invention, it is said, performs the duty satisfactorily, burning the crude material without smoke or offensive odor.

"Stanford Brothers have also expended capital and labor in efforts to manufacture oil from California petroleum, and have succeeded so far to make oil; but not with profit. Up to July, 1867, this firm had made 100,000 gallons of illuminating oil, and a nearly equal quantity of lubricating, and have been making about 20,000 gallons of illuminating oil per month since. Their works are still in operation.

"For reasons stated, much of this oil is prepared to a standard density of 35° Baume, which causes it to burn better, and exempts it from the tax of 20 cents per gallon levied on coal oils of 36°.

"This firm purchases crude oils from several localities, but obtain their chief supply from tunnels and pits near San Buenaventura. The high cost of vessels to contain the oil when made; of transportation and interest on capital, and the low prices ruling for the imported article, are impediments to the successful development of this resource.

"It costs six cents per gallon for second-hand cans. New cans would cost 15 cents per gallon. Each 40 gallon barrel of crude material costs $3.00 or 7½ cents per gallon for transportation from the springs to the refinery works. As the crude petroleum only averages 45 per cent of marketable oil, each gallon of such oil costs 21 cents without the expense of refining, or the

20 cents for tax, or any allowance for commissions, loss, interest on capital, or other incidental expenses. For these reasons the interest is in a depressed condition. It is unprofitable to make the oil when the imported article is less than 60 cents per gallon.

"The material used by Stanford Brothers, in addition to the illuminating oil, produces about 25 per cent of lubricating oil, which if it could be sold at 25 cents per gallon would make the other branch of the business profitable. But there is no market for it, owing to prejudice against its use. The consumption of lubricating oil in California amounts to 500,000 gallons annually, including castor and china nut oils. That of illuminating oils reaches 900,000 gallons annually. Of course, this creates an important trade for importers.

"The Buena Vista Company made about 4,000 gallons of illuminating oil at their works near the springs, and other companies made more or less. Nearly a dozen companies had stills in operation for a short time. Mr. Scott made about 5,000 gallons at San Francisco. Mr. Williams, of the same place, has also made about the same quantity. Altogether, it is safe to estimate the quantity of California made coal oil at 175,000 gallons. The capacity of the stills for making it is sufficient to turn out 100,000 gallons per month.

"The idea that the manufacture of California petroleum may yet be made profitable is not abandoned. A company was organized at San Francisco as recently as September, 1867, with a capital of $1,250,000, for the purpose of working petroleum and asphaltum deposits."

Stanford Brothers' Refinery Changes Hands and Carries Through

To the late Josiah W. Stanford and to his cousins, the Misses Edith and Lucy Allyne, daughters of the late John W. Allyne, the writer is indebted for the following information relating to the subsequent history of Stanford Brothers' refinery, which forms an important link in the petroleum history of California.

With the strong competition of Pennsylvania oil products in the California market, Stanford Brothers not only imported such products themselves, but also imported Pennsylvania crude oil to be used in conjunction with that from California. In May, 1869, the Central Pacific Railroad was completed. Stanford Brothers then decided to sell their plant and business. On November 27, 1869, they disposed of it to the secretary of their company, who also happened to be their nephew, Mr. John W. Allyne, and to Mr. William H. White. The purchasers went into a partnership December 1, 1869, and the company was thereafter operated under the firm name of Allyne and White.

Leland Stanford, then president of the Central Pacific Railroad, was fond of his nephew John W. Allyne and was pleased to turn business to him. The railroad was paying $2.50 per gallon for lard oil to fill the journal boxes on its rolling stock. John W. Allyne suggested the use of California crude black oil for this purpose. It was successfully tried and Allyne and White secured an order to supply it. This formed an important item in their business and they continued to bring in crude oil from Ventura County. To burn under their stills the same California crude oil was also used. They also supplied refined lubricating oils to the railroad.

When Allyne and White saw that the cost of bringing Pennsylvania oil by ship to California was too high, Leland Stanford was appealed to, and by special arrangement, a tank was mounted in a cradle attached to a flat car and the first oil tank car between Pennsylvania and California was put in operation. This continued until the rates by water were materially lowered.

In 1873 Allyne and White were burned out, but rebuilt and continued their business. About this time they also went into the manufacture of tree sprays.

By 1882 the California oil industry had become a certainty and Allyne and White had developed quite a business in supplying kerosene or coal oil throughout Northern California. The Standard Oil Company had already entered California to purchase companies supplying the oil trade. The going business of Allyne and White was sold to them. The plant was closed down. The still remained on the property until sold for junk during the first World War. So passed the largest of the initial oil refining plants of California.

Building of Railroad Through Newhall and Following Success of California Oil Industry

After 1866, which really ended the initial period of attempts to develop successful oil wells in California prospecting with wells was backward for several years. The building of the Southern Pacific Railroad through Newhall in Los Angeles County in 1876 is one of the potent factors that stimulated renewed activity and made our own industry profitable. Prior to 1876, oil had been obtained in this neighborhood mostly by pits and shallow wells, but transportation was very costly. Three shallow wells drilled by spring poles in Pico Canyon in 1875 produced a little oil. In 1877 actual development by steam machinery with experienced men in charge took place, and deeper wells brought better production. Oil was then rapidly developed in this district both in Los Angeles and in Ventura counties and the industry received the impetus that has since brought California to the front rank of oil producing states. The founders of the Pacific Oil Company acquired a small refinery at Newhall in 1876, and built a larger one at Alameda Point in Alameda County after the incorporation of that company September 10, 1879. (Calif. State Mineralogist Report 1884, pp. 278-309.) Hardison and Stewart, the two Pennsylvania operators, had been carrying on exploratory work with tunnels and wells, and had spent $130,000 in prospecting. Their Mission Transportation Company shortly became a factor in the development of Los Angeles and Ven-

THE ORINDA PETROLEUM COMPANY well on the Glorietta Anticline near Orinda, Contra Costa County. Drilled to 3033 feet in 1931, it cut oil and gas sands. Equipment was not capable of drilling deeper. Gas developed 240 pounds pressure, but no oil came in. (Idle since The Buttes Oilfields, Inc., a subsidiary, leased and brought in a gas field at Sutter Buttes.) (Photo by Walter Stalder, 1930.)

tura counties. (R. P. McLaughton Bull. 69 Calif. State Min. Bur. p. 369.)

The Pacific Coast Oil Company had as its officers C. N. Felton, President, D. G. Scofield, Auditor and L. D. Fish, Secretary. The offices were at 402 Montgomery Street, San Francisco. (History of Alameda County by Munroe-Fraser, J. P., p. 83. M. W. Wood Publisher Oakland 1883.) This company was operated until 1902 when it was absorbed by the Standard Oil Company.

Frustration of Scott's Texas & Pacific Railroad Plans

Unfortunately for California and its infant oil industry, Col. Thomas A. Scott was not destined to see the constructive plans for his Texas and Pacific Railroad to California, or his visions of the accompanying industrial oil development in this state, come to the fruition he so conscientiously strove for. As previously mentioned, the Central Pacific Railroad group completed their line to California in May 1869. They desired a monopoly on all transcontinental railroads to this state and to all perquisites thereto. Their project had been financed by public subscriptions, by government subsidies and by government land grants. The president of this railroad was Collis P. Huntington. He well knew how to manipulate matters in Washington and carry on actual railroad construction so as to frustrate any competition from Col. Scott's Texas and Pacific Railroad. Or from another competitor, the Atlantic and Pacific Railroad. When Col. Scott sought government assistance to complete his road, the Central Pacific group opposed him in every possible manner. It was 1881 before the resultant contest between these two interests was culminated. In December of that year the Southern Pacific Railroad, of which Collis P. Huntington was also president, finished its line across the Rio Grande ahead of the Texas and Pacific and thereby fulfilled a condition imposed by Congress that blocked any subsidies from the United States government to the Texas and Pacific Railroad and so halted its further construction. Bancroft, in his "History of California", sums this matter up: "The history of the Texas and Pacific, unlike that of the Atlantic and Pacific, forms no part in the railroad history of California except as showing how and in what degree eastern competition in transportation was kept out of the state."

Col. Scott passed away in 1881 at the early age of 57 years. Many old time Californians held the belief that the contest over the building of his road to California, and the attendant disappointments, undermined his health and brought about an early death. He was known as a wide awake, energetic, honorable business man. Had he been able to complete his railroad and follow through with oil exploration as planned, this state would have had the benefit of the further services of a most valuable pioneer, and the subsequent history of its oil industry, as of the state itself, would have been much different from what is now written. Competition brings development, and such railroad competition in early California had been destroyed. (Note: In seeking further data on Col. Thomas A. Scott, the writer was advised by Mr. Warwick Potter Scott, a grandson, that all of the Scott correspondence was unfortunately burned in a conflagration in the offices of the Pennsylvania Railroad. Many of the facts concerning the methods of the Central Pacific Railroad officials in defeating the Texas and Pacific before Congress and in other activities, were brought out in what was known as the Colton trial of 1882 before Judge Temple of Sonoma County, California, wherein Mrs. D. D. Colton, the widow of an associate of the Central Pacific Railroad projectors, sought to settle her deceased husband's estate, which consisted of varied interests in the many enterprises of the group. At that time letters from Collis P. Huntington to D. D. Colton, her deceased husband, were placed in evidence and caused a great sensation, not only in San Francisco, but through the nation. — See John P. Young's San

Francisco, A History of the Pacific Coast Metropolis, Vol. II, p. 589-590. The S. J. Clarke Publishing Company, Chicago and San Francisco 1912.)

Union Oil Company of California Formed

After the death of Colonel Scott, Thomas R. Bard continued in the management of the California interests for the Scott estate. During the years that Scott was working to get his road to California, two enterprising pioneers from Pennsylvania, W. L. Hardison and Lyman Stewart, had been endeavoring to build an oil industry in Ventura and Los Angeles counties. After many disappointments they were getting a foundation started, were in production, and had a gathering system. In 1890 Bard brought about a combination of certain of the Scott oil interests, with those of Hardison and Stewart, and the Union Oil Company of California was formed. The California oil industry was thereby greatly stimulated. Among the oil holdings going to the new organization were many of the mineral rights in Humboldt County.

Subsequent Exploration In Humboldt County

After abandoning of operations in Humboldt County in 1867, nothing further was done until the early nineties when a well was drilled on the ranch of J. C. Briceland in Section 18, T. 4 S., R. 3 E., H. B. & M., and within the hamlet of Briceland. This well was started in 1892. It was reported as having encountered both oil and gas but got water in drilling deeper. It was shut down but developed gas which, beginning May 1894, was used in the buildings of Briceland for light and fuel and is still in use there. (Communication from Albert Etter of Ettersburg with data from Mrs. J. W. Bowden, who taught school at Briceland when gas was first used.) This well was drilled by Eureka businessmen and is reported as having been sunk 800 feet. The gas smells of gasoline.

In 1892 the Burrows (Far West) well was drilled near the mouth of Davis Creek, near which the Union Oil Company of California controlled acreage. It was also near the first California drilling site of 1861. This well was reported as having been drilled to about 800 feet. It found some oil. Mr. L. P. Branstetter, who was ranching on Davis Creek at the time, stated that after drilling had been stopped for a time, two men arrived and put a blast of dynamite in the hole. This brought a good showing of oil. These men afterward cut a pine sapling which they rammed into the hole with the drilling tools and the well was so left.

A. N. Guptill was a land surveyor who had done considerable early work in Humboldt County. Not only was he acquainted with timber and farm lands, but he had also surveyed prospective oil lands for Scott and Parsons in 1865. Up Clark gulch, a north branch of Bear River, was a spot where oil globules occasionally broke out on the water. This was known to Silas W. Morrison, a young active rancher, landowner, and a first settler of the region, who early became keenly interested in its gas and oil possibilities and was adept in finding gas and oil seepages. In 1865 Messrs. Guptill and Morrison accordingly went to explore this prospect, and as they dug a trench rain began to fall. The rain became so heavy that they realized quitting time had arrived. Before stopping Guptill plunged the point of his pick into a sandstone exposure that they had uncovered. When he removed it oil spurted out of the small hole so made. This has since been known as the Guptill spring. Guptill filed on the surrounding land for Col. Thomas A. Scott and was given a one-third interest in the mineral rights to this 280 acre tract. He was an improvident man, but always desired to return value for any favors shown him. He had done some timber cruising for Joseph Stalder, a merchant of San Francisco and father of the present writer. Later, when he was in need of funds, he, one Sunday in October 1891, called at the Stalder home in Oakland, narrated the story of his interest in the Humboldt County oil claim and offered it for sale. Joseph Stalder knew but little of the oil business and was not desirious of taking a minority interest with strangers in anything of this type, although he had been a great admirer of Col. Thomas A. Scott. However, the silvery locks and the unsteady hand of Mr. Guptill indicated that the shadows of the evening of his life were darkening. He had been a good worker and a true and loyal friend. There was but one course to follow and the oil interest was purchased. A. N. Guptill passed away in 1893. This oil land interest was forgotten, until through church circles, Joseph Stalder met E. M. Hoagland, who had been active in early Coalinga, McKittrick and other San Joaquin Valley fields, and was more or less of a lease man, promoter and mechanic. This acquaintance led to the ultimate leasing by Stalder and Hoagland of some 30,000 acres of land in the Bear River and Mattole sections in 1898 and 1899 and to helping with the second fairly wide Mattole Valley exploration of 1900-01.

At this same time Mr. Angus Mackintosh, a banker of Seattle, was securing a lease at McNutt gulch near where the Allen and Sutter wells had been drilled in 1865. Between the first and second periods of Humboldt County oil exploration, some roads had been built, and drilling equipment somewhat improved. The spring pole had gone out of use and steam driven standard rigs were in general demand. There was a keen interest again developed in this northern exploration and the following wells were put under way:

Well Name	Sec.	T	R	Date	Depth	Remarks
Craig No. 1	30	1 S	1 W	1901	200	#1 crooked. Both abandoned after securing a geologic report.
Craig No. 2	30	1 S	1 W	1901–2	800	
Mackintosh	29	1 S	2 W	1900–1	1750	Some oil at 300′ and 1100′ but not commercial.
Reid	14	1 S	2 W	1901	400	Some gas. Abandoned.

Baker & Hamilton (Hoagland)	2	3 S	1 W	1900–1	2100	Some oil at 1214′ but not commercial.
Wild Goose 1	15	1 S	2 W	1900–1	1033	Lost tools, abandoned and moved rig. Good seepage.
Wild Goose 1a	15	1 S	2 W		700	Big seepage at 633′. Much gas. Below 670′ well caved and tools lost. Abandoned.
Humboldt	6	2 S	1 W	1900–1	2000	Trace of oil.

Stalder and Hoagland sub-leased land to Dr. E. L. Dow of Oakland. This Oakland dentist then became very active in interesting others and in getting wells started. He was responsible for drilling the two Wild Goose test wells, also the Humboldt, to 2000 feet, and was instrumental in bringing about the drilling of the two Craig wells. An Eureka Attorney, Mr. J. F. Coonan, was also active at this time in interesting capital in the Craig wells and in the Briceland district in which he had been interested in the well there drilled in 1892. F. E. Herrick a surveyor of Eureka was also active. The Hoagland well was drilled to 2100 feet by the San Francisco hardware firm of Baker and Hamilton through the efforts of Joseph Stalder.

The Wild Goose wells gave the most promise at this time. They were drilled on Joel Flat near the site of the former Scott and Parsons well of 1865. Wild Goose No. 1 reached 1033 feet and had a good oil seepage and strong gas but caving formations froze the tools, which could not be fished out, and the derrick was moved. Well No. 2 had passed through a good oil seepage at 633 feet, and was nearly 700 feet with much gas showing, when caving occurred and here a second string of tools was lost. In the meantime the financial backers of the Craig wells brought a geologist to the field. His report was evidently not encouraging because work on the Craig well promptly shut down as did that projected for Briceland. Dr. Dow's Humboldt well was costly without much oil showing and with the added grief of the lost tools in his Wild Goose wells, his associates became discouraged and his companies also shut down. The Mackintosh well had some good showings, but it was not commercial. The Reid well was little more than a spud-in. The Hoagland (Baker and Hamilton) well looked good at one time when an oil seep was found at 1214 feet but when bailed only a small amount of oil came up. This well was also shut down and the second oil excitement of Humboldt County, in which thousands of acres of prospective lands were taken up by mineral filings and leasing, came to an end.

In 1908-1912 J. F. Coonan, L. F. Puter and a number of their Eureka business friends drilled two wells on the Jesse Walker ranch (Sec. 20, T. 1. S., R. 2 W. H.) under the company name of Mattole Development Company. The first well caved and the second was drilled to 1800 feet without commercial result.

In 1908-1910, Milton McWhorter, who had been a pioneer in the McKittrick oil field of Kern County, interested Eureka capital and drilled two wells on Bear River, one at Capetown and one further up the river. One of these reached 900 feet but neither was commercial.

The records of California wells drilled since 1914 have been kept by the California State Division of Oil and Gas. A study of that Division's publications and contacts with the field indicate that later operators, with their wild-cat wells have as yet been no more successful in obtaining large production than were their earlier predecessors of 1865. As yet, no later well has shipped as much oil as did the Union Mattole well of 1865. The Cape Mendocino Oil Company, which had a shallow well in Sec. 21,1 S., R. 2 W. near the site of the Scott and Parsons well of 1865 and the Wild Goose wells of 1901, encountered the same beautiful greenish oil at shallow depths, but not in large quantities. This well was put down by Nash and McDonald, who incorporated the Cape Mendocino Oil Company. That company and its assigns drilled to 2624 feet, reported high gas pressure and an excellent oil showing in the hole. The casing was reported to have collapsed, and so again ruined the deeper test that the Wild Goose wells of 1901 were also unfortunately unable to accomplish.

Near the site of the former Baker and Hamilton (Hoagland) well of 1901 the North Counties Oil Company drilled to 1967 feet and produced a small amount of oil which was pumped from the well and created considerable interest in August 1921. Mr. Ernest C. Matthews of Eureka was president of this company. Oil sands were encountered at 590 feet, 1874-1883 and at 1920 feet was sandy shale with oil. At 1967 feet the casing froze. It was then perforated and collapsed. A second well was drilled 280 feet from the first well to a depth of 2310 feet and the outlook was particularly bright. The oil was very light and the gas pressure was good. Gas from between two strings of casing was reported as furnishing fuel to the boilers. This well, however, did not prove commercial. Work with these two wells spread over a span of eight years and it was 1929 before the second well was given up.

Dr. Ernest Hymans of Hayward, California, also became interested in Humboldt County in 1921. He planned to drill on the Edmonstone ranch near the site of the Union Mattole well of 1865 and also up Buckeye creek in Section 6, T. 2 S., R. 1 W. He also had plans for drilling at Briceland. Through his efforts the Humboldt Oil Company was formed. (Note: This should not be confused with the company of the same name organized by Dr. E. L. Dow in 1900.) The well on Buckeye creek was drilled to 3306 feet but was unsuccessful.

The Humboldt Basin, which includes the lowlands and slopes to Humboldt Bay and to the lower Eel River, had previously received but little attention. However, in 1926 the Eureka Oil Company was formed through the efforts of Frank Johnson as promoter and

the quiet assistance of certain Eureka business men who had always been interested in such matters. A well was located on Humboldt Hill near the Country Club at Field's Landing Sec. 21, T. 4 N., R. 1 W. on the Duff ranch. This well found some gas and had some oil showings. It passed through later Tertiary beds of the type found in the Ventura Avenue Field of Ventura County and down into a sandstone that resembled some of the older sandstones of the Mattole District. This well was not commercial and was abandoned in 1936.

In the same Humboldt Basin and on Table Bluff hill, the Texas Company spudded their Eureka 1 in Section 1, T. 3 N., R. 2 W. and drilled through Tertiary rocks into suspected Franciscan rocks without success and their well was abandoned in 1935.

The Texas Company, however, were not discouraged, and later brought in a gas well in this same basin, as will be discussed later under gas fields.

Other unsuccessful operators in the Mattole area were Revert Mining Company, Sec. 6, T. 3 S., R. 1 W., drilled in 1928 to 1284 feet and abandoned in 1930; Schaufele and Reynolds, Sec. 1, T. 3 S., R. 1 W., drilled in 1931 to 90 feet and abandoned in 1935; H. M. Anthony and W. C. Werele, Sec. 12, T. 1 S., R. 3 W., drilled to a depth of 485 feet and abandoned in 1939, and Ernest C. Matthews, Sec. 30, T. 1 S., R. 2 W., spudded in 1929, drilled to 428 feet and abandoned in 1939.

On the north flank of Humboldt Hill, Sec. 16, T. 4 N., R. 1 W., the Walter W. Eich well was spudded in 1935 and abandoned at 790 feet in 1936. This well was in the Tertiary Humboldt Basin area where there is an abundance of underlying organic shales of the same general type as found in some of the Ventura County and Los Angeles Basin oil fields.

Later Exploration At Point Arena

In the early nineties Mr. E. J. Beane, who had drilled for oil near Halfmoon Bay, San Mateo County, heard of bituminous sands at Point Arena and made an investigation. On one of his trips in 1897, he walked in from Ukiah over the hills, a distance of fifty miles, and arrived late one evening weary and footsore. It was on this trip that Porter O'Neal signed up a lease with him. Mr. Beane received backing to the amount of $5,000 from a man named Watson, who lived in the neighborhood of Napa, California. He shipped in a rig and made a location on the O'Neal ranch about 100 feet west of the topmost exposed oil sand which dipped westward at a steep angle. The well was drilled to approximately 600 feet. It encountered heavy asphaltum sands at a depth of about 100 feet and kerosene was used to drill through it. It also encountered other similar sands below but failed to produce liquid oil or asphalt sufficiently fluid to pump.

After the failure on the O'Neal ranch, Mr. Beane moved his outfit about 1 mile south—on what was then the Curley ranch, to a spot approximately 1000 feet to the north of the outcropping asphalt sands at the Port of Point Arena. Here he lost his tools in the hole and failed again. His backer was broke and very much disappointed. The L. E. White Lumber Company, owners of the land embracing the outcrop at the harbor, then financed Mr. Beane and had him drill a well closer to the outcrop and on their land. Here the sands were cut just below sea level and contained the same type of heavy tar met with on the O'Neal ranch. The bailer brought much of it to the surface. Kerosene was again used to drill through it and several sands were penetrated but no flowing or pumpable oil was found. The project was abandoned.

In 1900-01, the Mendocino County Oil Co.—Messrs. Plageman, Blaskower and G. Robbins, of San Francisco, drilled at a location made by August S. Cooper, California State Mineralogist, about 1200 feet southwest of the bituminous sandstone outcrops on the Porter O'Neal ranch. They drilled to 2000 feet. At 1200 feet they encountered the bituminous sands with plenty of gas and quite a showing of oil. They tried unsuccessfully to shut off water—using beans, rice, wheat and iron filings. (Note: This was before the technique of cementing off water had been developed.) The driller claimed there was a good showing of oil when the venture was abandoned. The well was drilled to 2000 feet because the contract stated that depth. There was a three-inch hole, and it bubbled gas up through the water as long as the hole remained open.

In 1909 what was known as the John D. Hicks well was drilled on the Christensen (Curley) ranch between the harbor outcrop and the O'Neal outcrop. Gas and oil were reported first at 310 feet and better between 1085 and 1200 feet. A string of light weight casing was cemented in and the hole bailed. The casing collapsed. A swedge failed to open up the casing. The lower portion of the casing was shot off and sidetracked and the hole drilled to 1700 feet without further showings and the well was abandoned. It showed oil on the top of the water for years. It had much gas. (Data from Thomas O'Neal and from scrap book of Joseph Stalder.)

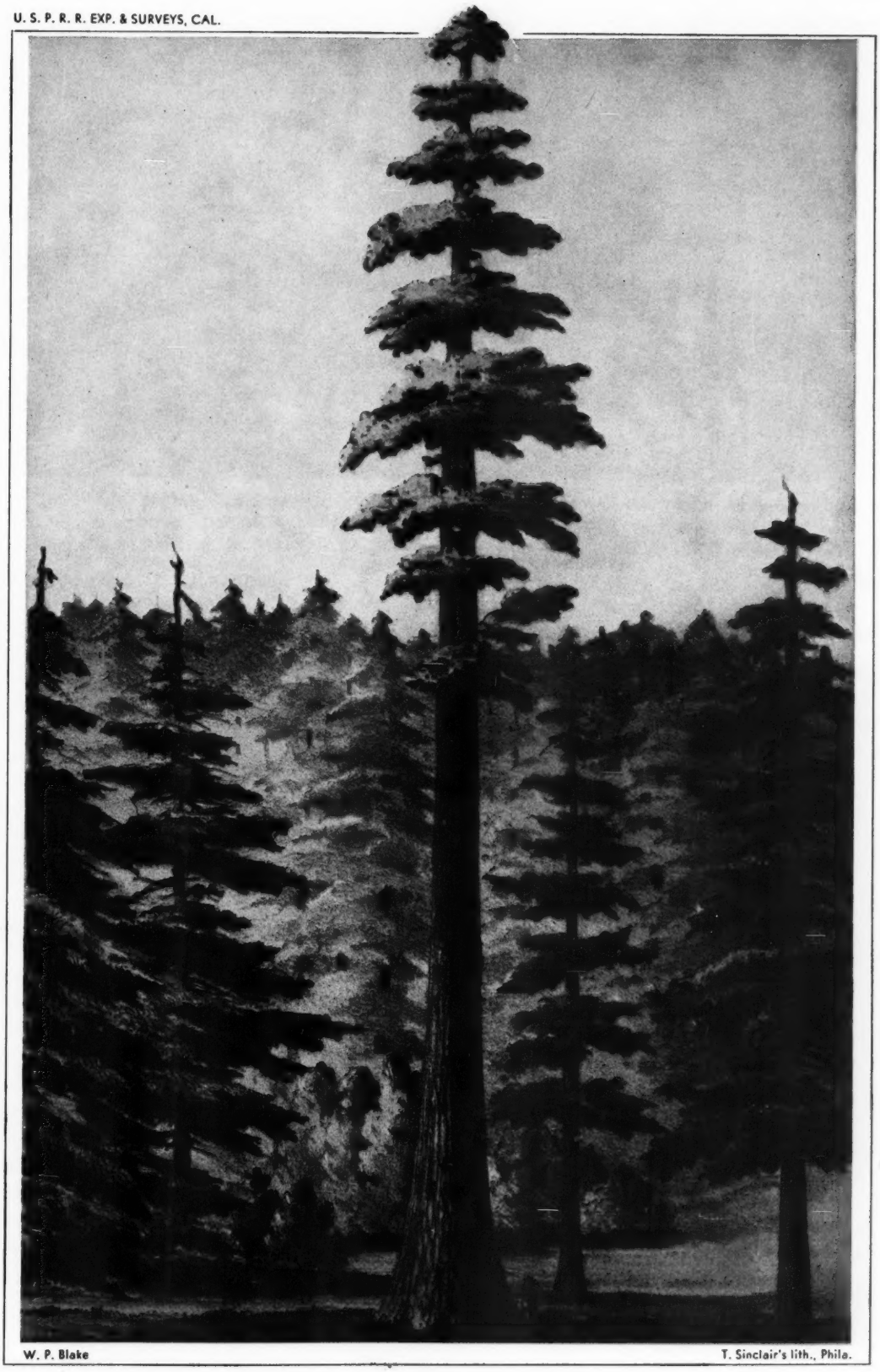
In 1918 Mr. M. J. Brandenstein, J. S. Silverberg and

→

THIS IS A SEQUOIA GIGANTEA, one of the Big Trees in the Calaveras Grove, reached from Angels Camp in the Mother Lode country. It was relatively small, being only 15 feet in diameter and 325 feet high. At the time this drawing was made, a larger tree had been cut down. It was 28 feet in diameter, and was cut down by boring through it with pump-augers about six feet above the ground, an operation which employed five men for three weeks. The largest tree standing in the grove was measured and found to be 31 feet in diameter.

Ed.—Note that this lithograph was made in the east from a sketch. The artist had never seen a redwood, and it is not surprising that in some respect the tree foliage resembles the evergreens found in the vicinity of the Lakes in the Italian Alps.

U. S. P. R. R. EXP. & SURVEYS, CAL.

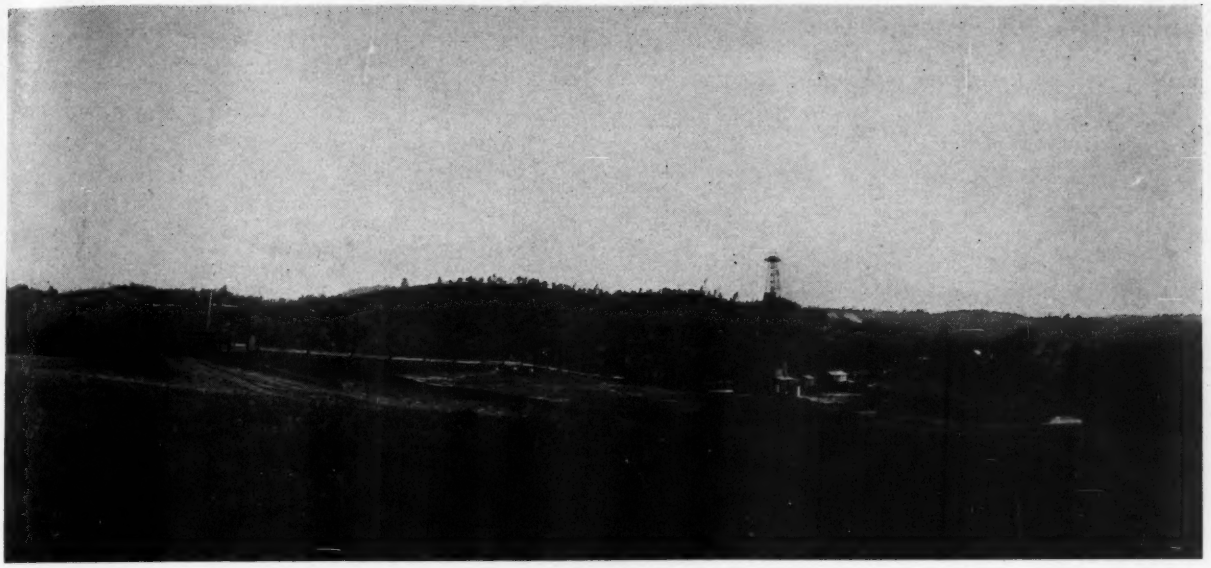


W. P. Blake

T. Sinclair's lith., Phila.

MAMMOTH TREE "BEAUTY OF THE FOREST."

UNIV. OF MICH.



ATOP THE NIGGER HEAVEN DOME (Rumsey Hills), the well of Nigger Heaven Dome Oil and Gas Company reached a depth of 6764 feet in April, 1934, but had not reached the prospective oil sands, which were the goal, because the equipment was found to be too light to go deeper. It stands today emitting gas, salt water, and oil, which collects as a scum on the slush pit. Standard Oil Company Tippetts No. 1-1 is now drilling one mile to the north of this location. Excellent drilling mud is to be found on the surface and the mixing box and trough at the left indicate the plant for its preparation. (Photo by Walter Stalder, 1932.)

a number of their friends from San Francisco, were induced to take over a number of oil and gas leases at Point Arena and drill a shallow hole at the axis of an anticline to the northwest of the port. The hole was drilled to 786 feet and cut sands, but the tar in them was too heavy to pump and the well was abandoned.

In 1930 the Twin States Oil Company, a subsidiary of the Sun Oil Company, drilled a deep test near the northward plunging end of an anticline, around which bend the bituminous sands at the Port of Point Arena in Sec. 14-12 N 17W., M.D.M. This well was at the top of the bluff immediately to the south of the port and started below the horizon of the nearby outcropping bituminous sands. It was drilled to a depth of 7694 feet. When tested, the few Point Arena citizens who witnessed it reported that gas shot light oil over the crown block of the derrick but the flow was not sustained and the well was ordered abandoned.

In 1940 the Keyt well, on Lot 4, Sec. 11, T. 17 N., R. 4 W. of the former Porter, now Thos. O'Neal ranch, was spudded in. This hole at 1250 feet has encountered the upper tar beds that outcrop to the east and should soon determine if at this point, farthest removed from the outcrop sands, will contain fluid oil.

Porter O'Neal, early pioneer, untiring prospector, and kindly friend of all, who tried to bring successful oil development to Point Arena, passed away in 1923 with a true prospector's faith that what he helped start will one day be successfully finished.

Later Work in Santa Clara County Brings Commercial Production

C. N. Felton and P. C. McPherson had been operating in Los Angeles and Ventura counties. McPherson sold his interest to Felton and in 1878 came from Newhall to Moody Gulch and took over the leases and developments where the Santa Clara Petroleum Company had left off in 1866. Mr. McPherson was born in Buffalo, New York in 1840, went with his brother to Pennsylvania in 1859 and operated in the oilfields until 1873, when he came to California as agent for Farrar & Co. of Buffalo, New York, manufacturers of engines and drilling machinery. He was enthusiastic about the Moody Gulch district and was persevering in his work. This was rewarded by bringing in five really successful wells. From one of the old wells he obtained for a time 60 barrels of 46% 47° B. oil from a depth of 700 feet. This was sent to the Newhall refinery because the plant at Alameda Point had not yet been completed. His field being near the railroad facilitated such shipments. His Santa Clara Petroleum Company drilled ten wells between 1879 and 1888. They varied in depth from 800 feet to 1615 feet. Several sands were usually found. The five best wells had initial productions of from 10 to 100 barrels per day. In 1884 this production was shipped to the Pacific Coast Refinery at Alameda Point, but in 1888 it was being sold for $3.00 per barrel to the San Jose Gas Works. To 1888 the production of this field was reported as 80,000 barrels. (H. S. Foote Garden of the World or Santa Clara County, California. The Lewis Publishing Company; Chi-

cago, 1888 pp. 164, 165; Hanks, H. G., Calif. State Min. Bur. St. Mineralogists Report 1884 pp. 278-308; and Min. and Sci. Press Dec. 20, 1879.) This small oil field is still an intermittent producer of petroleum.

The Sargent Ranch field (Sec. 36 and vicinity, T. 11 S., R. 3 E., M. D.) also in Santa Clara County, and near the railroad, likewise received new attention. The asphaltum oil from the pits at Tar Creek was being cleaned and shipped to San Francisco in 1884. Four years later some of this same material was being used in the gas works at Gilroy. New drilling took place in 1886 and the field slowly developed. Production from this field has never been great, but it is still producing oil. At the time of the writer's last visit there in 1920, the Watsonville Oil Company was producing about 55 barrels per day from nine wells of not over 1200 feet in depth (Hanks, H. G., Calif. State Mineralogists Report 1884, p. 289. Irelan, W. Calif. State Mineralogists Report 1888, p. 548. McLaughlin, R. P., Calif. State Min. Bur. Bull. 69, p. 470.) Deeper drilling by the Continental Oil Company, the Shell Oil Company, the Santa Clara Oil Company, the Petroleum Midway Co., Ltd. and Douglas S. Watson in this neighborhood has not been successful.

Halfmoon Bay Area—San Mateo County

Drilling had taken place subsequent to 1880 at Tunitas Creek and at Purisima Creek. When visited by the State Mineralogist in 1884, several wells had been drilled on the former stream and some oil could be pumped from one of them. (Goodyear, W. A., Calif. State Mineralologist Report 1888, p. 100.) This pumper must have been on the O'Brien ranch, which well had oil standing in it when visited by the writer in 1916. The Purisima Creek area has produced oil but in small amounts. Mr. S. A. Guiberson, who drilled five of the wells, advised the writer that they had initial production of 10 to 20 barrels but the production declined rapidly. These wells are 700 to 750 feet deep, and, to date, about twenty such shallow holes have been drilled. The oil is light and prior to 1908 was refined by Mr. Knapp in Halfmoon Bay. It was shipped out in drums, and by 1915 this production had dwindled to but one carload per year as indicated in a letter written by Mr. J. W. Crosby, secretary of the former Ocean Shore Railroad to Mr. F. W. Bradley May 15, 1915. On the Savage ranch, about 3 miles a little south of east from Halfmoon Bay, a chocolate brown oil sand outcrops. About 1898 George Owens drilled near the Savage ranch and down the dip of this sand. The well reports a 20 foot oil sand commencing at 30 feet. This produced a heavy black tar. The well was reported to have drilled to 1200 feet, where granite was encountered. (W. L. Watts, Calif. State Mining Bureau Bulletin 19, pp. 154-155, 1906.) Evidently this sand had attractions for later operations with deeper wells out toward the ocean. Wells over 1700 feet in depth were there drilled by the Shell Oil Company, Berger and Coglin, Elk Hills Pool Oil and Gas Co. A and C Oil Company, C. C. Julian, Sage, Olsen and Blalach, and W. & A. Sage. None of these was successful. These were drilled between 1921 and 1925. The Shell Oil Co. Cowell well No. 1, in Sec. 8, T. 6 S., R. 5 W., was the deepest, being abandoned at 5905 feet.

In the vicinity of La Honda and Bellvale a number of unsuccessful prospect wells were also drilled between 1921 and 1935. The deepest of these was that of the La Honda Oilfields Assn., Sec. 16, T. 7 S., R. 4 W. It reached a depth of 3140 feet .

Sonoma County

Prospecting in the vicinity of Petaluma was instituted in 1909 by the Petaluma Home Oil Company and by the Ramona Oil Company, because of the outcropping of oil sands and the presence of gas. Although some strong gas blowouts occurred in Ramona well No. 1, no commercial production was made until Herbert N. Witt and associates, drilling on the Ducker Ranch in Lot 269 of the Petaluma Ranch survey, encountered oil of 19 degrees Baume at 900 feet in November 1925. This well had an initial flow of 20 barrels per day. The product was sold to the Shell Oil Company to be used for fuel in drilling other wells. The Witt well produced about 5000 barrels, of which 3000 went to the Shell Oil Company at $1.00 per barrel. On deepening the Witt well, salt water was encountered and served to ruin the production of this hole. (Data from Herbert N. Witt, Mining Engineer and Geologist.)

The Shell Oil Company drilled four wells on this structure. Their Mossi No. 1 encountered a heavy flow of gas at 1400 feet but was drilled to 2140 feet. The gas was not put to commercial use. Other wells of this company encountered basalt into which their Murphy No. 1 continued to 6385 feet without getting through it.

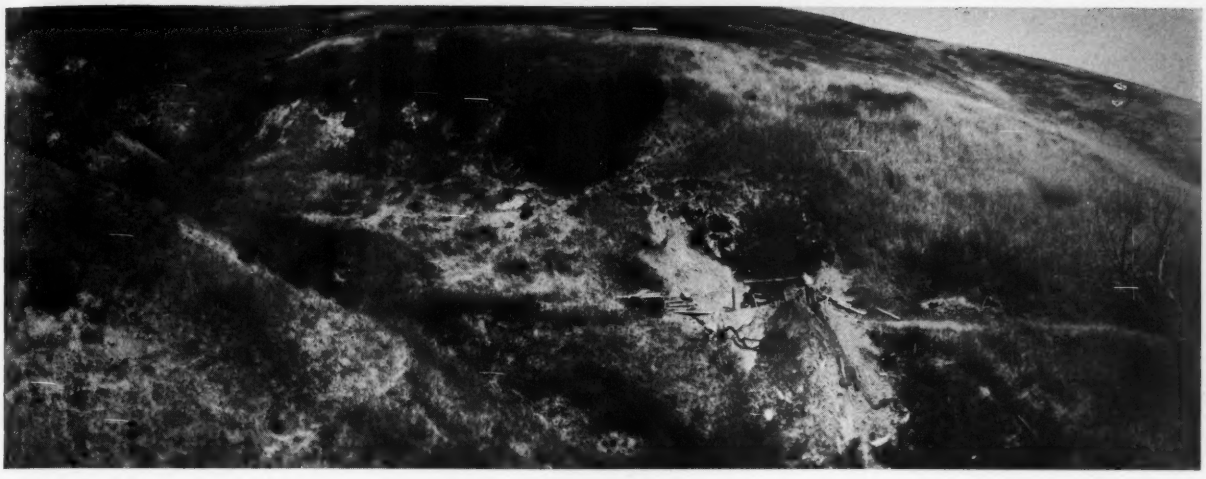
This area was idle until in 1941. The Trico Oil and Gas Company now have a gas well at 1214 feet which is reported as under 450 pounds closed in pressure and on a preliminary test indicated 3000 to 4000 M cu. ft. when blown for one hour through a 40/60 inch bean, with flowing pressure of 400 pounds. The gas is nearly pure methane with 1002 B.T.U.

Since the Sonoma County wells are in the northwestern part of a Tertiary basin that extends from the vicinity of Tesla in Alameda County to Santa Rosa in Sonoma County, the results of certain wells in the Alameda and Contra Costa County portions of this basin may be of some interest.

Alameda and Contra Costa Counties

At the oil sand outcrop on the Old Tar ranch near the site of the abandoned well of 1862, M. J. Lamance, a real estate man of Oakland, Calif., drilled a well to 170 feet in 1899. At this same place the Mount Diablo Oil Company of San Francisco drilled in 1900.

E. L. Doheny's San Pablo Oil Company of Los An-



WHEN CLEANED OUT IN 1932, Dexter Cook's Sutter Buttes shaft of 1864, afforded a copious gas flow through a small pool of water at 20 feet. In the barren spots below the shrubs in the left center of the photo, gas puffs could be ignited. In several spots, but particularly at the bottom of the gulch, the shales were found partially fused through past burning gas. The shales which abut the volcanic andesite, are baked and cracked through past igneous heat. This condition was anticipated as forming a likely reservoir for gas and oil at depth near the contact.

geles drilled in 1900 on the Mulford ranch, about one mile northeast of San Pablo, and at 670 feet reported traces of oil and inflammable gas.

The Grand Pacific Oil Company, A. G. Deardorf, president, located a well on the ranch of Josephus Hodges about 1 mile east of Lafayette. This was abandoned when visited by the writer in 1907.

The Sobrante Oil and Investment Company, at a location about 1¼ miles northeast of the oil sand outcrop in the Old Tar ranch, was preparing to drill in 1900. (Data from personal notes and from W. L. Watts Bull. 19, Calif. State Mining Bureau 1900.)

None of the above wells produced commercial oil. The interesting feature is that the oil sand outcrops and general conditions are quite similar to those near Petaluma where The Trico Oil and Gas Company are testing their gas well.

On the Miner ranch on Lauterwasser Creek, about 1½ miles north of Orinda Post Office, eight wells varying from 570 to 2750 feet in depth were drilled prior to 1907. Small amounts of oil and gas were encountered in some of these, and the Flood well in Pleasant Valley 1½ miles to the southeast was reported as having yielded five barrels of 29 degree Baume oil. (Ralph Arnold U.S.G.S. Bull. 340, p. 340 1907.) The Flood well was idle and oil could be dipped from it for many years. This area has been mostly idle these many years.

The Alisal Oil Company well located by Colonel M. M. Ogden, encountered oil in Sec. 15, T. 3 S., R. 3 E., M.D.M. on the Hamilton ranch in the east end of the Livermore Valley July 9, 1910 at a depth of 887 feet. This area had been tested about 1887 with what is known as the Gutman well, drilled to 250 feet, and a second drilled by Gutman and Fusier to a depth of 750 feet. Oil seepages in the neighborhood, and the fact that the early 250 foot Gutman well had good oil showings, are doubtless what prompted the Alisal development. (Data from scrap book and records of Joseph Stalder.) The Alisal well was only a small producer, however, of 40 degree Baume oil and was not commercial. A number of later wells have been drilled in this vicinity but without commercial success.

Two wells drilled by the Standard Oil Company of California on the Altamont Anticline (Sections 20 and 27, T. 2 S., R. 3 E.) one to a depth of 1090 feet and the second to 2878 feet, in 1908, are mentioned in passing. These were drilled in Cretaceous rocks and on a structure that is now being tested by the Shell Oil Company with their Nissen No. 1 well in Sec. 7, T. 2 S., R. 2 E., M.D.M.

A well drilled by the Orinda Petroleum Co., Ltd., in Sec. 32, T. 1 N., R. 3 W. on the Glorietta Anticline, one mile south of Orinda, in 1930 and 1931, to a depth of 3033 feet, is now standing idle. It developed a gas pressure of 240 pounds with heavy gas of 1120 B.T.U. that would blow its head off in one hour. Cores from 777 feet at intervals to bottom cut for oil. (Note: This company took leases at Sutter Buttes in Sutter County and organized a subsidiary company, The Buttes Oilfields, Inc., which in 1933 brought in the first high pressure discovery gas well in Northern California as will be mentioned later. With activities elsewhere, deeper drilling in the Orinda well was deferred.)

The deepest well in Contra Costa County was drilled by the Tassajara Oil Corporation in Sec. 9, T. 2 S., R. 1 E., M. D. in 1938 and 1940. Although located at the surface axis of a sharp anticlinal fold it found the sands which cut for oil too tight to yield and the well was abandoned.

The Lafayette Oil Company Morris No. 1, Sec. 28, T. 1 N., R. 2 W. was located on an anticlinal fold but crossed a fault and was abandoned in 1941.

Other wells drilled in this basin in Alameda or Contra Costa counties have as yet afforded no real commercial gas or oil production.

Outside the basin mentioned, Wm. Edwards drilled a well on a structure in Knoxville shales in Sec. 31, T. 2 N., R. 2 W., Contra Costa County, in 1924 and 1925. This well encountered small amounts of a high grade oil and although abandoned in 1925 at 2224 feet it has afforded useful information of a fundamental type to future Northern California operators.

Marin County

About 1902 the Point Reyes Peninsula again received attention and two wells were drilled on the mesa above Duxbury Point without commercial result. Detailed and reliable information regarding these has not been obtained.

Sacramento Valley Basin Subsequent to 1868

To drill in a locality simply because of its gas or oil seepages, with neglect of a proper investigation of the controlling structural conditions of the region, was the practice of operators for many years in the Sacramento Valley, as it had been in Humboldt County, where failure after failure resulted. It was not until just prior to 1900, when the Gorrell and Smith Oil Company drilled on the north end of the Rumsey Hills anticline (Nigger Heaven Dome) in the SE ¼ Sec. 7, T. 13 N., R. 3 W., M.D.M. Colusa County, that structural conditions in the Sacramento Basin appear to have been given some consideration. Subsequent to this, however, many operators still persisted in carrying on operations either close to seepages or on the down dip side of outcropping gas or oil sands.

Wells drilled by the Williams Oil Company between the years 1902 and 1909, in Sections 7, 16 and 18, T. 15 N., R. 4 W., to depths of between 750 feet and 2800 feet (Bull. 69, Calif. State Min. Bur. p. 442) were mostly of this type. A group of wells drilled by the Griffiths Oil Company in Sec. 27, T. 8 N., R. 3 W., Napa County, in 1921 and 1922, to shallow depths were also of this type. Although production in small amounts was found, no large commercial wells resulted. Wells drilled for a medicinal oil near outcropping oil sands in Section 31, T. 15 N., R. 4 W., Colusa County, by the Calivada Superior Oil Company and others, between 1922 and 1933, were again of this type.

Prospect pits and tunnels along Bear Creek, Colusa County, were dug to as late a date as 1934, although all evidence through the years since 1865 indicated that production would not be commercial. One gas tunnel known as the "Gibson Gusher" E ½ Sec. 21, T. 14 N., R. 5 W., Colusa County, afforded lubricating oil for the axles of farm wagons of the neighborhood from time to time. This, together with sales of small quantities of seepage oil for use in curing skin diseases, reflects the small commercial value of this work.

In 1921 the Blue Ridge Petroleum Company, W. J. B. Lee, general manager, drilled a well on the northeast flank of the Rumsey Hills anticline in Sec. 34, T. 13 N., R. 3 W., M.D.M. This well was drilled with standard tools and below the surface were many known gas and oil sands to be reached with the bit if the hole could only be drilled to sufficient depths. Mr. Lee reported the first gas at 670 feet, a heavier flow at 1090 feet, more at 1220 feet, an oil show at 1440 feet and a large flow at 1650 feet which he estimated at from 4,000 M. to 6,000 M. cu. ft. per day. He reported this gas as carrying 0.95 gallons gasoline per M. cu. ft. Water was not shut off, the tools were lost and the hole was abandoned. This well marked a better structural approach toward successful commercial development than any previous wells in the Sacramento Basin.

The Mutual Oil Company, later the Continental Oil Company (S. H. Keoughan, Trustee), with full knowledge of various neighboring gas and oil sand outcrops and structural conditions of the Sites anticline on which shallow Antelope Valley spring pole wells of 1865 had been drilled, made a location in 1923 in Sec. 31, T. 18 N. R. 4 W., Colusa County, and drilled to 1876 feet with standard tools. This well is reported to have had such difficulty with successive high pressure shallow gas sands, and with associated water sands, that it was lost without being tested. Gas is reported to have escaped through a blowout in a barley field 200 feet from the well. The derrick was moved, rotary equipment used, and a second hole was drilled to 4277 feet with a reported repetition of the same battle against high pressure gas and water sands with no tests of any horizons for either gas or oil. The scientific location of these wells marked a real advance in Sacramento Valley exploration, but, having been unfortunately abandoned without testing, the operation has chiefly served to encourage future developments on this and other satisfactory structures about the Sacramento Valley Basin. These wells also indicated that very high gas pressures are to be expected in the Cretaceous formations of Northern California.

Near the top of the Rumsey Hills (Nigger Heaven Dome) the George F. Getty Guinda Well No. 1, SW ¼ of NW ¼ Sec. 23, (?) T. 12 N., R. 3 W., M.D.M., Yolo County, was spudded in near the top of the subsurface structure in August, 1930. At 1826 feet the well started making gas with salt water, and from this point on drilling was a battle with both. This company drilled to 2007 feet and quit. This holding was later taken over by an independent group that formed the Nigger Heaven Dome Oil and Gas Company and the well was known as the Lee-Bow Well No. 1. The new company successfully shut off this gas and water at 2519 feet and drilled to 6764 feet, having cemented a second string of casing at 5226 feet. Below this latter depth

gas and oil began to show with surging in the casing, and gas and an oil film on the ditch. Their goal was to reach the soft porous sand that outcrops near the former Calivada Superior wells in Section 31, T. 15 N., R. 4 W., some fifteen miles to the northwest. As the well reached greater depths, the equipment became too small to handle the drill pipe, the company funds were low and the well was shut down. It stands today with gas, oil and water flowing slowly into the slush pit and a scum of paraffin oil accumulating on the surface of the pit. The Standard Oil Company of California are now drilling their Tippetts Well 1-1 in Sec. 15 on the same structure and one mile north northwest from Lee-Bow No. 1. This marks a further advance in the intelligent location of Northern California prospect wells.

With knowledge of the findings of Dexter Cook and associates at the Sutter Buttes in 1864-65, and of the many oil and gas sand outcrops on the west side of the Sacramento Valley, a well was located (Sec. 35, T. 16 N., R. 1 E., M.D.M.) approximately ¼ mile southeast of the spot where Cook had his workings and a test well was drilled by The Buttes Oilfields, Inc., spudding in October 16, 1933 and completing as a gas well at 2727 feet February 9, 1934. The highest closed in pressure recorded the day before the well was brought in was 1420 pounds. The odor is that of an oil gas. It has 1006 B.T.U. The well gauged for 3,425 M. cu. ft. While not a large well, it was the first high pressure gas well successfully developed in Northern California. Six locations have been drilled to date and the product is being sold to the Pacific Gas and Electric Company to supply domestic and manufacturing needs in adjoining communities. This field was discovered by geologic methods. (See Bull. Amer. Assn. of Petroleum Geologists Vol. 16, pp. 361-371, 1932.) The field is unique in that it is structurally different from any other California producing area. Between 13,500 and 20,000 acres are here considered as potentially possible for further exploration.

Other Northern California Gas Fields

With the vast amount of effort and capital expended on various abortive ventures in other parts of Northern California it may be interesting to return to the general region of Stockton and the delta of the Sacramento and San Joaquin rivers, where the first commercial gas in California was developed. Here many water wells developed gas, much of which was used for domestic and for steam generating purposes. Gas companies were later formed for developing and marketing this commodity. In 1885 there was the Standard Gaslight and Fuel Company of Merced, formed for developing natural gas in the San Joaquin Valley, and in the spring of 1886 operations were commenced at Stockton. In the summer of 1886 the California Well Company of Stockton was organized and promptly went to work. The Crown Mills well drilled in 1886, developed a gas flow of 18,000 cu. ft. per 24 hours from a depth of 1220 feet. Lighting of the plant required 6000 cu. ft. and the remainder was used as fuel. The Stockton city gas supply was continuously augmented by natural gas from water wells. The greatest yearly production was 313,392 M. cu. ft. in 1910, valued at $159,451.00. The recorded production of natural gas for San Joaquin County from 1899 to 1916 was valued at $2,284,635.00. The producing wells varied in depth from 1000 to 2000 feet, with water always accompanying the gas. (See Symonds California Mineral Production and Directory of Mineral Producers for 1934. Calif. Dept. Natural Resources Div. Mines Bull. 111, pp. 220-221.)

Gas was discovered in water wells near Sacramento in 1891. This was also utilized. Production in 1913 was valued at $33,000.00 and from 1899 to 1916 at $758,073.00. (See Symonds Calif. Min. Prod. and Directory of Minerals for 1934. Bull. 111, pp. 208-209.)

The gas well drilled at Briceland in Humboldt County has been already mentioned. The Texas Company in searching for oil associated with the organic shales of the Humboldt Basin, has developed two small gas wells on Tompkins Hill. (Sec. 22, T. 3 N., R. 1 W., H.M.) This development of The Texas Company marks a forward step in relation to scientific application of well location methods.

In 1901 the Rochester Oil Company drilled a well to a depth of 1820 feet in NE ¼, Sec. 24, T. 5 N., R. 1 W., M. D., Solano County, in the vicinity of surface gas shows. (Sec. 11 and 14, T. 5 N., R. 1 W., M.D.) A 20 M. cu. ft. gasser resulted and was used in the towns of Suisun and Fairfield for a number of years. Between 1908 and 1913 the value of this gas produced was $61,-311.00.

In Sec. 7, T. 10 S., R. 14 S., M.D., Madera County, the Pure Oil Company brought in their well No. 1 in November 1934 as the first producer in the Chowchilla gas field. This well was 8030 feet deep and gauged 15,000 M. cu. ft. initial production. The gas contains impurities that reduce its heat value. This field was located with use of a seismograph.

The Tracy gas field (Secs. 15, 22 and 23, T. 2 S., R. 5 E., M.D.O.) in San Joaquin County, was brought in by the Amerada Petroleum Company with their No. F.D.L. 2 well August 12, 1935. It gauged 35,000 M. cu. ft. from a depth of 4,063 feet. About 350 acres are in the proven area and the gas is sold to the Pacific Gas and Electric Company. The seismograph was used in locating this field.

The McDonald Island gas field in San Joaquin County was discovered by the Standard Oil Company of California when their McDonald Islands Farms well No. 1 (Sec. 25, T. 2 N., R. 4 E., M.D.) came in at 5227 feet on June 2, 1936 with an initial production of 26,647 cu. ft. The proven acreage is approximately 5000 acres. Being in the flat valley area, the seismo-

graph was necessary in locating this field. (Data from C. G. Gester, Chief Geologist, Standard Oil Co. of Calif.)

In June 1936 the Rio Vista gas field in Solano County was brought in by the Amerada Petroleum Corporation when their Emigh well No. 1 (Sec. 35, T. 4 N., R. 2 E., M.D.) came in with an initial production of 81,250 M. cu. ft. per day from a depth of 4410 feet. A gasoline condensate accompanies the gas. In 1938 some 5000 acres were considered as proven but subsequently wells drilled across the Sacramento River in Sacramento County have extended it and its true limits are exactly known. Knowledge of surface gas blowouts in Secs. 11 and 14, T. 5 N., R. 1 W., M.D. and scattered rock exposures about this field suggested its presence. The seismograph was also used in verifying its presence.

The Fairfield Knolls gas field in Yolo County was brought in November 6, 1937, when Standard Oil Company of California brought in well No. 1 (NE ¼, Sec. 32, T. 9 N., R. 1 E., M.D.) This well had been drilled to 5181 feet and was plugged back to 3700 feet. It is rated as a 3,500 M. cu. ft. gasser for conservative delivery. Prior to drilling this field Standard had drilled on a structure in the Dunnigan Hills. Their Peter Cook well No. 1 was there drilled to 5009 feet and abandoned October 27, 1937 because the sands were too tightly cemented to yield commercial gas. Both Dunnigan Hills and Fairfield Knolls are topographically high. The seismograph was used to verify structure. (Data from C. G. Gester, Chief Geologist, Standard Oil Company of California.)

As early as 1920 the Honolulu Oil Company had drilled to a depth of 3128 feet on the Potrero Hills anticline, Solano County and abandoned the project. In December 1938 the Richfield Oil Corporation completed their Potrero Hills No. 2 well (Sec. 10, T. 4 N., R. 1 W., M. D.) at a depth of 3265 feet and an initial production of 5,000 M. cu. ft. This structure is clearly indicated on the surface. No seismological survey was necessary.

That excessive gas pressures are present in the Cretaceous rocks of Northern California was known after the Blue Ridge well was drilled on the Rumsey Hills structure and the Continental wells on the Sites structure in Colusa County. As if to emphasize this the Ohio Oil Company Willard Well No. 1 (Sec. 18, T. 20 N., R. 2 W., M.D.) in Glenn County on January 7, 1937 blew out of control from just below 4400 feet with a heavy gas flow accompanied by salt water. The derrick and much of the equipment were engulfed and went out of sight in the crater which was 150 feet in diameter. This crater spouted gas, mud and salt water for over two weeks.

The Vernalis gas field developed in Cretaceous rocks in Sec. 25, T. 3 S., R 6 E., M.D.M., San Joaquin County was brought in by the Standard Oil Company of California's Blewett Community Well No. 1 at 3872 feet. It flowed 9,292 M. cu. ft. through a 40/64 inch bean with 1125 lbs. tubing pressure and 1115 lbs. casing pressure in January 1941. A second well has been drilled but the area of the structure has not as yet been determined.

"No large commercial gas or oil wells north of Coalinga" has been the firm conviction of most ultra conservative California oil operators. One of the happiest moments in the life of a true wild-catter is when he can drill a successful well and upset such mistaken notions. Through the past pages the reader may readily observe that with the large number of wells drilled and the comparatively meager results it has been quite natural for such convictions to ripen into prejudice. Fortunately wild-catters held a different opinion and as a result some of the finest gas fields are now being developed in this previously forbidden terrane. When advanced technique, equipment, knowledge and dauntless courage of the type that characterized our earlier pioneers is unstintingly and open-mindedly applied to new Northern California problems or to new phases of its past problems a far different vista may be in prospect than the present history has given in retrospect. The pleasure of trying to solve nature's problems and create new wealth with the crude tools and knowledge of their time was evidently enjoyed by these earlier courageous trail blazers. Fundamentally such is the spirit that makes for a true democracy and affords a pride in writing of it.

Early Chinese Played Important Part

In Pioneer California Refining

Other than as cooks in company boarding houses, the petroleum industry has seldom employed Chinese. The sulphuric and hydrochloric acid industries, however, the products of which are indispensable for treating oil distillates, and in making zinc chloride for a flux in soldering cans, employed Chinese laborers extensively. Immediately after the discovery of gold in California Chinese miners, merchants, and laborers, arrived here in increasing numbers, and, with the building of the Central Pacific railroad, more were brought to the Pacific Coast. Because of their seemingly odd and cheap methods of living in small quarters, a willingness to work where the white man would give up, and a tendency to bring and keep their own strange customs, they were at first not generally liked. However, as time went on, and these patient Orientals

became better acquainted with American ways, to better understand them, a mutual respect developed. So steady and reliable were such workers that any employer who formerly used them regrets that these old Chinese who talked pidgin English and had a subtle sense of humor, have almost entirely passed from the scene, while the real picturesque and useful part they played in several California industries will never again be repeated. The younger Chinese are thoroughly modern and not trained to the same role as their forebears.

The former San Francisco Chemical Company at Flemings Point in West Berkeley manufactured sulphuric, nitric, hydrochloric acids, and zinc chloride. A fair portion of their products went to oil refineries. White men as a rule did not care to work in certain parts of the acid plant where special care must be taken against acid burns to the worker or his clothing. Woolen clothes were worn, and as occasion arose, rubber boots and rubber gloves were required. The patient Chinese would work in such places with no objection whatsoever to changes of apparel when required. Chinese economy soon found that woolen garments for such operations could best be secured in second-hand clothing shops dealing in cast off army goods. Such United States army uniforms, shirts, and socks, adorned the persons of most of these workers, without any particular care as to suitable size or fit, a low price being of chief concern. Nitre for nitric acid manufacture was imported from Chile in jute bags. These bags were washed to remove all nitre from their fibres and thereafter made excellent aprons for the workers without cost to them. The Chinese did not drink water, but each carried his own jug of tea to work daily. At living quarters he also had a small tub in which he washed his feet at noon, and after work in the evening. They belonged to two companies operated by two separate "boss" Chinamen and lived in large quarters with a partition down its center—one company occupying one side and the other the opposite side of the building. Each company did its own cooking and living costs such as provisions for either company were prorated among its members. Each boss Chinaman received a percentage of earnings from the members of his company and attended to all bargaining with the plant manager.

MANY OF THE FIVE GALLON KEROSENE CANS sent to far Cathay, to be later used strung to poles and carried across the shoulders of their cousins, were soldered with zinc chloride, in the manufacture of which Chinese employed by the San Francisco Chemical Company had a part. These laborers also helped with the manufacture of sulphuric acid for the refining of various petroleum products. Such labor has now vanished from the industry. (Photo by Walter Stalder, 1907.)

There was keen rivalry between these companies as to which were the best workers, and as a result, both men and the plant benefitted.

One of the physical features of the chemical company manager was a rather prominent nose. These Chinese did not know his name, or if they did it would have been too difficult for them to pronounce. Pay day was any time after the first of the month that the manager happened to go from San Francisco to the plant with the pay checks in his pocket. Beginning the second of the month, the Chinamen would have one of their number inquire at the plant office, "Big No, he kom? Big No, he kom?" As he made and repeated the inquiry, the end of his arched forefinger would be placed between his eyes and the end of his thumb on his upper lip in representation of the manager's nasal appendage. There was no disrespect intended, and the office staff knew exactly what was desired by this unique method of Chinese expression. (Personal notes of the writer in 1907.)

The Rise and Fall of Napa Petroleum Co.

The late Frank A. Leach, in his book "Recollections of a Newspaper Man" (San Francisco Samual Levinson Publisher 1917) pp. 100-01, in discussing oil excitements, records the following:

"There was another oil excitement in Napa which for a few days overshadowed the Humboldt interest. Doctor Stillwagon, a great wag, declared Napa to be the greatest country on earth, and felt it should not be excelled or outdone by any other section of the state. As the production of mineral oil seemed to be a subject uppermost in every one's mind and most attractive as a source of wealth, the doctor further said that oil should be found around that section without delay, and took it upon himself to make the discovery. His large practice as a physician took him almost daily into the country. On one of these trips he returned with a soda bottle filled with water and oil in about equal proportions. This he exhibited to town people, stating it had come from the Goodrich ranch about three miles east of town. The news of finding the oil spread quickly,

creating intense excitement. Soon the road to the ranch was filled with vehicles conveying people to the newly discovered oil field. A company was organized to buy lands and bore for oil. The news reached San Francisco. People came from there to see the oil. Everybody was shown the spring on the hillside with a film of oil floating over the water. All the visitors who saw it were convinced that oil had been discovered. Doctor Stillwagon seemed depressed, however, and had little to say other than to caution his friend against excitement. The discovery was three or four days old when a couple of well known San Franciscans came up to see the spring. I piloted them to the ranch. When we arrived there the owner's little boy ran out to open the gate that we might drive through. As he did so one of the gentlemen, throwing the boy a quarter, said, 'Bub, how much oil did daddy put in the spring this morning?' The boy to the great surprise of all hands, replied as promptly as an impediment of speech would permit: 'A-a-about a b-b-bottle f-f-full!'

"It is almost needless to say, this candid answer exploded the local boom to the great delight of the doctor, who had only intended to have a little fun, but was greatly worried when the joke got away from him, and he found his words of caution were regarded by his friends as efforts to mislead them for selfish interests."

The above copy of a stock certificate is mute testimony of that Napa Oil Company, and was kindly loaned by E. R. Leach to be copied for use as an illustration in the present history.

•

Brief Biography of the Author

When in 1891 Mr. A. N. Guptill sold Joseph Stalder his Humboldt County oil interest he sold Walter Stalder, a lad of ten years, the idea of making petroleum prospecting his life's work.

When Walter Stalder entered the University of California in 1900 there were no courses directly planned for students wanting to study the oil business. He was probably the first student interested in this course. He found that the best preparation could be made through the college of chemistry by taking electives in geology and engineering. Upon graduating in 1904 there were no geological positions open, in fact operators in general had no use for geologists.

In 1909 Mr. M. L. Requa, president of the Nevada Petroleum Co., appointed Walter Stalder geologist and investigator for his company. In 1911 he was loaned to the Union Oil Co. to make a valuation of their properties and as a beginner in valuation work this assignment was completed largely through the kindness of Mr. W. W. Orcutt and Mr. W. L. Stewart of that company. The chief value of this particular job was that it stepped up a fundamental percentage decline method of valuation, that Mr. Orcutt has been using in a very practical manner, to a preliminary decline curve method of estimating oil reserves.

About 1916 Mr. M. L. Requa went to assist Herbert Hoover, the Nevada Petroleum Co. was sold and Mr. Stalder established his own consulting office in San Francisco, since which time investigations have been made in North America and elsewhere as far west as Sumatra.